

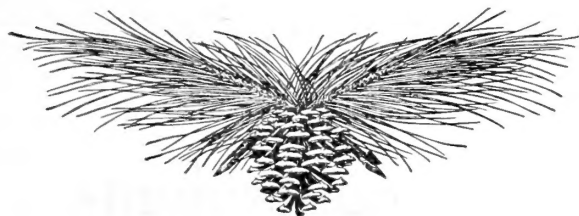
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# FOREST WORKER



*July, 1931*

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*Issued bimonthly by the* FOREST SERVICE  
UNITED STATES DEPARTMENT OF AGRICULTURE

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## Announcements

### Pacific Science Congress

The Fifth Pacific Science Congress is to be held at Victoria and Vancouver, British Columbia, May 23-June 4, 1932, under the auspices of the National Research Council of Canada. It is planned to have a half-day session on each of the six following subjects: Trade in forest products, meteorology and terrestrial magnetism and forestry; entomology and forestry; wood products and products research; silvicultural research; and pulp, paper, and cellulose. The general secretary of the congress is S. J. Cook, 79 Sussex Street, Ottawa, Ontario. The chairman of the sectional committee on forestry is P. Z. Caverhill, chief forester,

British Columbia Department of Lands, Victoria, British Columbia.

### New York and New England Foresters to Meet on Rogers Estate

The New York and New England sections of the Society of American Foresters will hold a joint meeting September 3 or 4 on the Rogers estate, at Hyde Park, N. Y. This estate affords an example of the results of 20 years' adherence to a forestry management plan, such a plan having been prepared for it by the United States Forest Service in 1905 and followed out consistently.

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# FOREST WORKER

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## State Forestry

### New York Extends Application of Forest Tax Law and Enlarges Adirondack Park

A 1931 amendment to the Fisher forest tax law of New York, which as passed in 1929 and amended in 1930 provided for the relief of taxation on planted forests, extends the provisions of the law to forests naturally reproduced. This law provides that immature forest growth, occupying tracts at least 15 acres in extent, such as will eventually develop merchantable timber crops may be exempted from taxation, and that so long as the timber is thus exempted the assessed valuation of the land which it occupies can not be increased. It provides for a yield tax amounting to 6 per cent of the stumpage value of the timber.

An act signed by Governor Roosevelt March 18 extends the Adirondack Park by 1,550,000 acres, making its total area 4,604,000 acres. Of the land thus added to the park, 1,201,000 acres is privately owned and 349,000 acres is State owned. This act, Commissioner Morgenthau explains, brings into the park all the forest land in the Adirondacks that is desirable for forest preserve and park purposes. On all State-owned land within the Adirondack Park boundaries timber cutting is perpetually forbidden.

The bill proposing a constitutional amendment that would provide for the appropriation of \$19,000,000 over a period of 11 years for establishing forest nurseries and for acquiring land and reforesting it was again approved by the legislature. This proposal will be submitted to popular vote in November, 1931.

The life of the reforestation investigative commission created by the New York Legislature in 1928 has been extended by one year.

### Montana Authorizes Exchanges of State-Owned Forest Land

Exchange of State-owned forest lands for forest lands in Federal or private ownership is provided for by an act of the Montana Legislature approved March 16. Proposals for such exchanges are to be referred to the State forester for investigation. His findings are to be presented to the State board of land com-

missioners, which if it favors the exchange is to publish a notice reciting the general terms of the proposal and naming a date on which the board will hear any objections to the proposal pending final action upon it.

Another Montana act of 1931 makes it unlawful to operate a portable sawmill on forest land within the State without first obtaining a license from the State forester. Violation of this provision is made punishable by a fine of from \$25 to \$500.

### Nevada Enters Cooperative Agreement for Forest Fire Protection

Nevada has entered into an agreement with the Federal Government under provisions of the Clarke-McNary law for cooperative protection of forest lands from fire. The agreement declares that protection is needed for 315,000 acres of forest land in the State, establishes 0.2 per cent as the maximum to which it is desired to restrict the proportion of forest land burned annually, and mentions \$13,557 as the estimated cost of maintaining this standard. The first allotment of Federal funds for forest fire protection work in the State will be available for the year beginning July 1, 1931.

A special act of the Nevada Legislature was necessary as a prelude to the forming of this agreement.

### Michigan Centralizes Responsibility for Conservation Work

The Michigan Conservation Department's field forces of law enforcement, forest-fire control, lands, and game refuges have been merged under one head, to be known as field administrator. Howard R. Sayre has been promoted to the new position, from that of chief fire warden. Mr. Sayre has had experience in the department's field activities as chief forester of the land economic survey and as assistant State forester. The scientific phases of the department's work are hereafter to be directed by P. S. Lovejoy. Mr. Lovejoy has had experience as a national forest supervisor, a member of the forestry faculty of the University of Michigan, and a magazine writer. More recently he has helped organize Michigan's land economic survey and reorganize its fire, land, and game divisions.

## Indiana Has New State Forest Under Management

Acquisition work of the past two years has put the State of Indiana in possession of a consolidated forest tract of 10,000 acres in Morgan and Monroe Counties, 4 miles due south of Martinsville, which is being placed under management as the Morgan-Monroe Counties State Forest. Nine-tenths of the area is timberland; the remainder is old fields. Repeated burning has in the past caused much destruction of timber. Unusual timber-growing and recreational possibilities are seen in the area by State Forester Wilcox. Some excellent young second-growth timber is present, including poplar, walnut, ash, maple, and oak. The topography is very hilly. A fire lookout tower has been erected and manned, 556,000 forest trees and walnuts were planted this spring on about 500 acres of the old fields, and a beginning has been made in stocking the forest with pheasants and wild turkeys. An aerial photographic map has been prepared as a basis for management of the area.

## Colorado Provides for Creating State Forest Through Land Exchange

Authority has been given to the Colorado State Board of Land Commissioners to exchange school, university, penitentiary, or any other State lands for Federal lands of equal area and appraised value, in order to consolidate an area of forest land that will constitute the Colorado State Forest. The board is made responsible for managing and protecting the forest. Anyone who through negligence is responsible for fires on the State forest or who removes timber from it without authority will be liable to a fine of not more than \$300 or imprisonment in the county jail for not more than three months, or both such fine and imprisonment.

## Pennsylvania State Forests Enlarged by 17,926 Acres

State forest land purchases closed by the Pennsylvania Department of Forests and Waters in April and May of this year aggregated 17,926 acres. Two tracts in Lycoming County were added to the Tiadaghton State Forest, one of 174 acres on the eastern shore of Pine Creek and one of 377 acres adjoining the public highway. An addition of 13,385 acres was made to the Tioga State Forest by purchase from the Central Pennsylvania Lumber Co. This land borders Pine Creek on the west and consolidates the department's holdings from Leetonia northward to West Pine Creek and the public road, and also adjoins the Stone purchase adjacent to the Leonard Harrison State Forest Park. It includes a tramroad grade on which has been constructed an improved State forest road

paralleling Pine Creek. Two purchases totaling 3,630 acres were made on the Michaux State Forest.

Most of this land cost the State \$3 per acre. The other prices paid were \$2.75 and \$3.50 per acre.

## Minnesota Law Provides for Forestry Development of Tax-Delinquent Lands

By RONALD B. CRAIG, United States Forest Service

An act approved by Governor Olsen on April 25, 1931, makes possible a new form of public forest domain in Minnesota. The new law is entitled "An act relating to and authorizing the creation, establishment, and maintenance of State reforestation or flood-control projects or other public State purposes, and providing \* \* \* for their management and control; \* \* \* providing for the acquisition by the State of unredeemed tax-delinquent lands therein and the use and disposition of such lands for such purposes \* \* \*."

In brief, the law provides for acquisition by the State of tax-delinquent lands in any county in which such lands on January 1, 1931, formed more than 35 per cent of the total taxable lands of the county and "of which the bonded [drainage] ditch indebtedness \* \* \* equals or exceeds 9 per cent of the assessed valuation of the county." Such lands are to be administered by the department of conservation for "afforestation, reforestation, flood-control projects, or other public State purposes." The department is authorized to make and enforce all necessary regulations for the care and development of the lands and for "experimenting in and practically advancing" forestry, flood control, and "other public State purposes," which may include wild-life conservation and management and forest recreation.

The projects thus provided for are to be financed by the issuing of county certificates of indebtedness and with revenue derived from the use and management of lands acquired under the act (as from timber sales, licenses, and camping and special-use permits). The department of conservation is authorized, also, to accept gifts and bequests for use in connection with these projects. The total issue of county certificates of indebtedness for the purpose of this act is limited to \$1,500,000.

The balancing of State and county budgets and indebtedness on such projects and the redemption of tax certificates and county bonds are provided for by a rather involved process.

The act vests the department of conservation with the right of eminent domain and authorizes it to acquire thereby, or by purchase, "any lands or interests in lands in any such project which said department shall deem necessary for State ownership, use, or development for the purposes of this act," subject to certain financial limitations relative to county indebtedness.

The act makes it a misdemeanor willfully to violate any of the rules and regulations promulgated by the

department of conservation in connection with the projects for which it provides.

## Minnesota Conservation Service Reorganized

A Minnesota law approved April 17 creates a conservation commission of five members to be appointed by the governor, with the consent of the senate, and to serve without compensation other than actual expenses. Heretofore the State department of conservation has been headed by a commission consisting of the commissioner of forestry and fire prevention, the commissioner of game and fish, and the commissioner of lands and timber. The commission is to employ as conservation commissioner a person having experience and special training in conservation work, whose term will be six years and who may be removed at any time by the commission for cause. The conservation commissioner's powers and duties will cover those formerly assigned by law to the commissioner of forestry and fire prevention, the commissioner of game and fish, and the commissioner of drainage and waters. All powers of the State auditor relating to public lands, timber, waters, and minerals are transferred, likewise, to the commissioner of conservation.

As units within the department of conservation the act creates a division of forestry, a division of drainage and waters, a division of game and fish, and a division of lands and minerals. Each of these divisions is to be under the immediate charge of a director subject to the general supervision and control of the conservation commissioner. The directors are to be appointed by the commissioner to serve at his pleasure. The director of forestry is intrusted with the administration of all State forests and other State lands acquired or set apart for forestry purposes and with the sale of all timber on such lands or on other State lands.



A law adopted this year by the Idaho Legislature and approved by the governor provides that land suitable for the production of trees, or watershed land, acquired by any county under a tax deed may be deeded to the Federal Government in exchange for stumpage. Stumpage so acquired is to be sold, and the proceeds of sale are to be deposited in the county treasury.



A leading project of the Connecticut Forest and Park Association is its effort to bring into public ownership desirable woodland tracts bordering highways. Individual subscriptions are being solicited by the association to build up a roadside woodland reservation fund. Unless in very exceptional cases, tracts purchased through the use of this fund will be deeded by the association to the State or to towns or villages.

## Bull Creek and Dyerville Redwood Forests to Become State Property

Negotiations recently completed by the California State Park Commission with the Pacific Lumber Co. have cleared the way for State acquisition of the Bull Creek and Dyerville redwood forests, and the Save-the-Redwoods League has received contributions and pledges covering half the purchase price. The other half will be available from State park bond funds. John D. Rockefeller, jr., gave \$1,000,000 and pledged a second \$1,000,000 to match other private gifts. Many organizations and individuals throughout the United States have contributed.

The area to be acquired is one of 10,000 acres. It includes the watersheds of Bull Creek, Decker Creek, and Cabin Creek, as well as the North and South Dyerville Flats. It will become a part of the Humboldt State Redwood Park, which with this addition will extend for more than 15 miles along the Redwood Highway north from Miranda (230 miles north of San Francisco) and will have a primary area approximately 4 miles square. At least 15 miles of river will be included, with varied recreational possibilities.

The Save-the-Redwoods League has been campaigning for the acquisition of these redwood forests for more than 10 years.

## What Connecticut Bought with Its \$100,000 Unemployment Relief For- estry Fund

Improvement work carried out this spring on Connecticut State forests on the basis of a special unemployment relief appropriation of \$100,000 has left the forests in better condition for fire control than they ever were before, says State Forester Hawes. More than 250 miles of firebreaks were cleaned out to a width of 15 feet, with all deadwood removed to a distance of 50 feet along each side. There are now very few areas of more than 500 acres on the State forests that are not cut by such fire lines; on some of the forests, including Paugnut, Nepaug, Mattatuck, and Nehantic, the areas uncut by firebreaks do not exceed 100 acres.

Work under the relief program included thinning 875 acres of timber and planting approximately 600,000 trees, mostly pine and spruce, on State forest land. The largest plantations were made on the Pachaug Forest area that was burned by a disastrous fire of May, 1930. Trained fire crews made available through the unemployment appropriation were helpful in holding the average area burned per fire in the spring season to 19 acres.



An act of the Illinois Legislature approved this year gives consent to Federal acquisition of lands in Illinois for national forests.



## Indiana Fire-Protection Program

By R. F. WILCOX, State Forester of Indiana

Part of the funds brought into the Indiana State treasury through a 2-mill levy for forestry purposes will be available for forest fire protection under a tax law amendment adopted by the legislature in 1931. Heretofore the proceeds of this levy, which brings in \$100,000 a year, have been available for State forest acquisition and distribution of nursery planting stock only.

Adoption of this amendment followed consideration by the assembly of the results of a fire survey carried out by the Indiana Division of Forestry in 1930. A field survey made in six representative counties indicated that at least 237 spring and summer fires occurred in the State during that year and burned a total of more than 133,000 acres. A similar survey carried out after the fall fire season indicated that 300 fires occurred in the State during that season, covering 175,000 acres. These figures include burning on private classified reserves, second-growth hardwood lands, abandoned fields reverting to forest growth, and swamp lands in northern Indiana along the Kankakee River.

At present the State has four fire towers, located on forests, parks, and game preserves, which have served as nuclei for systematic fire protection of State-owned land and contiguous private forests. Before the fall fire season of 1931 begins three new fire-protection districts will be developed in southern Indiana, including approximately 500,000 acres of privately owned land.

Under the plan of organized protection for the purpose of which forest owners are being organized into county fire protective associations, the State furnishes a tower and telephone lines and places a fire lookout on duty during dry seasons on each association area. Non-resident members of the association pay 1 cent per year for each acre of their land that is to be protected, and this money is used to buy rakes, axes, and other tools for the use of fire-fighting crews organized by the resident members of the association.

In Brown County, where the first protective association was formed this year, only two forest fires were reported in the spring fire season, whereas the fire lookout observed as many as 12 fires burning at one time in adjoining counties that were not organized for fire protection.

A recent survey of forests, swamp land, and waste land reverting to forests in Indiana indicated that about 3,000,000 acres of land in the State is in immediate need of systematic fire protection.

Since Indiana has an excellent program of State forest acquisition, a successful tax exemption law for private lands undergoing reforestation, an adequate forest nursery, and a definite forest research program, provision for forest fire protection on a satisfactory

basis gives the State a well-rounded forestry reconstruction policy.

## North Carolina Forest Fire Protection System Covers 10,000,000 Acres

From a very small beginning some 10 years ago North Carolina's cooperative forest fire protection system has grown to cover more than 10,000,000 acres of the State's 21,000,000 acres of forest land. Counties cooperating with the State in this work number 42. Thirteen landowners' associations give special protection to 350,000 acres. The protection system divides the State into eight districts, of which six are under the charge of technically trained district foresters. Fire-control efforts thus far are confined to the mountain and coastal plain regions, which include the largest areas of forest land and present the greatest fire risks.

Fire-protection appropriations of the counties cooperating in this work range from \$400 to \$2,000 per year. Yearly assessments of members in protective associations range from 1 cent to 5 cents per acre of land listed.

## Fire Emergency Committee at Work in California

On May 19 James Rolph, jr., Governor of California, issued a proclamation calling attention to drought conditions in the State and to the resultant fire danger and asking all agencies, public and private, to assist in protecting forests and range land. A special fire emergency committee was appointed, consisting of the heads of the principal State departments and of members of the State board of forestry. Charles S. Howard, of San Francisco, chairman of the board of forestry, is general chairman, and State Forester M. B. Pratt is executive secretary.

Many of the field divisions in the various State departments have been organized to assist in fire prevention and suppression. Among these are the divisions of highways, fish and game, highway patrol, and plant quarantine, and the National Guard. Cooperating agencies include the State chamber of commerce, the American Legion, automobile clubs, service clubs, conservation and protective associations, fire insurance companies, and the United States Forest Service.



Seven thousand acres of land in the towns of East Hartford, Glastonbury, Marlborough, Hebron, Andover, Manchester, Vernon, and Bolton, Conn., have been placed under protection by the Black Ledge Forest Protective Association, organized May 7. This is the seventh such organization formed in Connecticut and is the first formed in the portion of the State east of the Connecticut River.



## Rhode Island Legislates for Forest Protection and State Forest Acquisition

A Rhode Island law of 1931 authorizes the governor to declare a forest-fire emergency when in his opinion an unusual forest-fire hazard exists. While such a declaration is in force the commissioner of agriculture is to have full charge of forest fire protection activities, with power to appoint and employ as many as three district forest wardens. Another act removes the limit previously established by law on the amount that may be expended annually for State forestry activities. Under a third act the throwing of lighted material, such as tobacco or matches, on forest land, a private or public road, or a railroad right of way is punishable by a fine of not more than \$50. For the first time the Rhode Island Legislature passed an act requiring the installation of spark arresters on steam shovels, sawmills, and certain other devices, not including railway locomotives.

By another measure authority is given to the State commissioner of agriculture, with the approval of the governor, to accept gifts of property for general forest demonstration and experimentation purposes. Provision is made also for accepting gifts of money or securities to be used in promoting the practice of forestry on lands thus acquired.

For the old tree warden law has been substituted a new act amplifying the authority of town and city tree wardens and removing the limitation previously established as to the amounts that each town or city may appropriate annually for the use of tree wardens. This act authorizes tree wardens, the State board of public roads, the metropolitan park commission, or the park commission of any town or city to cause the removal from grounds under their jurisdiction of any trees or other plants that are obnoxious as hosts of insects or fungous pests.

## New Delaware Forestry Law Deals with Taxation, Acquisition, and Protection

A measure adopted by the Delaware Legislature at its 1931 session and approved by the governor provides for exempting immature forests from taxation and empowers the State forestry department to acquire land for State forests and parks and to appoint and supervise forest fire wardens.

The tax-exemption provision applies to tracts of not less than 5 acres of privately owned land well stocked with trees, either through planting or through natural reproduction, conditions on which are such that the development of a stand of merchantable timber is reasonably assured. Land carrying any stand of trees more than 5 feet in height, other than seed trees, is excluded from classification. The exemption period

30 years.

Land for State forest or State park purposes may be acquired by purchase or gift or otherwise, and may

later be sold, exchanged, or leased if the forestry department finds this to be to the advantage of State forest interests.

The State forester may appoint forest fire wardens to serve either voluntarily or under compensation, and game wardens and State police officers are made forest fire wardens ex officio. Fire wardens are empowered to obtain help in suppressing fires by employing assistants or, when necessary, by compulsion.

Willfully causing fire on forest or other land is made punishable by a fine of from \$200 to \$5,000 or imprisonment for not more than two years, or both fine and imprisonment. Causing fire through carelessness is made punishable by a fine of from \$10 to \$100. Refusing or neglecting to respond to a forest fire warden's summons or obstructing the work of a warden or warden's assistant is made punishable by a fine of from \$10 to \$100 or imprisonment for not more than 30 days. In addition to the penalties named anyone causing a forest fire is liable to the State for all expenses incurred in fighting and suppressing the fire.

## Airplane Service for Forest Protection in California

Through the cooperation of the National Guard of California the State division of forestry has several Douglas planes at its disposal for the 1931 fire season. The planes are stationed at Mather Field, a few miles from the State capitol at Sacramento. They are used chiefly for scouting large fires and for quick transportation of experienced fire fighters. The pilots and mechanics are regular members of the National Guard, assigned to this duty during the period of the emergency.

Three other planes are being operated for forest protection in California by commercial concerns under contract with the United States Forest Service. Commercial air transport companies, also, are reporting by radio all fires observed by their employees during flights.

For Texas State forestry activities in the biennium beginning July 1, 1931, an appropriation of \$129,710 has been made available. This is a slightly larger amount than was available for the purpose in the preceding biennium, aside from the \$25,000 previously appropriated for the purchase of a virgin longleaf pine area on condition that a like sum be raised for this purpose by private subscription.

New Hampshire has made it an offense punishable by a fine of as much as \$25 to throw or drop lighted material, such as a match or cigarette, from any vehicle on a public highway or private way or from any steam, gas, or electric car where the right of way is adjacent to woodlands.

## Forest-Tree Planting and Distribution by States Amplified in 1930

Official reports to the United States Forest Service covering the numbers of trees that were planted by State forestry organizations or distributed by them for planting in 1930 indicate an increase of nearly 11,700,000 over the numbers of trees so planted and distributed in the preceding year. In 1929 the numbers reported by 36 States and Porto Rico and Hawaii totaled 67,722,001; the 1930 total was 79,319,629. Reports of planting or distribution of forest trees in 1930 came from four States that had not reported any such activities for 1929—South Carolina, Mississippi, Texas, and Utah. Missouri, having reported some distribution for 1929, reported none for 1930.

In 1930 the forest trees provided by the States, in cooperation with the Federal Government, for planting on farms numbered 25,836,215, or 593,518 more than in 1929; trees planted on State land reached a total of 30,443,654, which exceeds the total so used in 1929 by 6,479,240; and trees distributed by States for planting elsewhere than on farms or State-owned land totaled 23,039,760, an increase of 4,524,870.

As in preceding years, New York used and distributed a greater quantity of forest planting stock than any other State, its 1930 total of 24,960,700 trees falling short of its 1929 mark by some 400,000 only. Michigan, in second place, added 8,497,454 to its 1929 total, with a distribution of 19,384,259. Following Pennsylvania's 9,511,435, the next largest totals for 1930 were as follows: Massachusetts, 3,860,215; Ohio, 2,643,392; Wisconsin, 2,395,000; Connecticut, 1,904,600; Vermont, 1,825,700; Porto Rico, 1,773,900; New Jersey, 1,417,200; Louisiana, 1,197,853; New Hampshire, 981,022; and Hawaii, 914,800.

Forest nursery expenditures by the States during 1930 totaled \$652,936. This includes a Federal contribution of \$73,272.

Legislative authority has been given in Minnesota for establishing and operating State nurseries for the production of forest trees to be planted on State-owned land. None of the stock is to be sold or given away. An appropriation of \$6,000 per year has been made available for the biennium beginning July 1, 1931.

New York increased its blister rust control forces this spring to 200 men. One task of these men is to clear and maintain a protective zone around each of the State's five forest-tree nurseries. Within a belt 1,500 feet wide around each of the nurseries all plants of the currant-gooseberry family are being destroyed, and cultivated black currants are being destroyed to a distance of 1 mile from each nursery. Similar protection is being given to areas newly planted in the State's reforestation program.

## Indiana Distribution of Walnuts for Planting

The Indiana Division of Forestry reports that 248 bushels of walnuts were distributed for planting this spring under a plan in which it had the cooperation of Frank S. Betz, of Hammond, Ind. The nuts were estimated to average about 1,000 to the bushel. Mr. Betz offered to give a bushel of walnuts to any school, club, or other organization that purchased a bushel from the State. Both the nuts sold by the State and those given away by Mr. Betz had been stratified in preparation for planting.

Many of the nuts were planted by school children on Arbor Day. The Marion County Fish and Game Association distributed 20,000 of them to sixth, seventh, and eighth grade children in about 40 township schools. Other agencies distributing large quantities were the Northern States Life Insurance Co., the Hammond National Bank, the American Maize Products Co., the Lever Bros. Soap Co., and the Hammond Park Board.

Game officials of the Michigan Conservation Department succeeded this year in their first attempt to relieve congestion at a deer-yarding area by trapping the surplus and transferring them to other areas. At a small winter yard in Fletcher Swamp, on the north edge of the Turtle Lake district, where supplies of food for deer had been gradually diminished by lumbering operations and by browsing, 100 deer were trapped and tagged. Of these, 96 were removed to other locations by sleigh and truck and liberated. With the newly designed trap used the catch averaged one deer per trap every two days.

Plans are being developed by the Wisconsin Conservation Commission under which private landowners carrying out measures calculated to encourage game restoration would be remunerated by the State. The commission has recommended that several methods of compensation be tried out, including the leasing of farms by sportsmen's groups, payment per head of game shot, and payment for hunting privileges by the day.

William Mauthe, chairman of the Wisconsin Conservation Commission, has placed before a legislative committee a proposal that prison labor be made available for State forest protection and improvement projects. Because of lack of funds the commission foresees that fundamental projects for State forest restoration can not be carried out for many years unless some such arrangement is made.

# Education and Extension

## Forestry Instruction Offered by Southern Branch of University of Idaho

Inauguration of instruction in forestry, logging engineering, and range management in the Southern Branch of the University of Idaho, at Pocatello, is announced by Executive Dean John Dyer. A 2-year course in forestry will be offered. With this addition to its curriculum the branch institution, which had an enrollment of 700 during the school year 1930-31, will be offering the first two years of a course in each of the standard professions. A full 4-year course in pharmacy is offered. The forestry professorship has been accepted by Charles M. Genaux, who for the past two years has been teaching forestry in the Utah State Agricultural College. Professor Genaux is a graduate of the Pennsylvania State College of Forestry and received the master's degree in forestry from the University of Idaho. He will enter upon his new duties September 1, 1931.

## Idaho University Experimenting with Blister Rust Parasite

Experiments with *Tuberculina mazima*, a fungus known to German pathologists as an enemy of the white pine blister rust, have been undertaken by E. E. Hubert, of the University of Idaho. Spore material of the fungus has been obtained from Karl von Tubeuf, forest pathologist, of Munich. Doctor Hubert has inoculated several western white pine trees in the Elk River district and intends to make laboratory tests to determine whether the fungus will function normally under the climatic conditions of Idaho.

This parasite on the white pine blister rust is described as growing each year several crops of microscopic spores which are distributed by wind over distances of several miles.



Best results in growing evergreen magnolia (*Magnolia grandiflora* L.) from seed are obtained by planting the seed in the fall immediately after collecting it, according to the results of tests made at the University of Louisiana by G. D. Marekworth, now professor of forestry in the University of Georgia. Removal of the fleshy coat from the seed either by hand or by the use of chemicals (caustic soda, petroleum ether, and chloroform) had no perceptible effect on germination. Experiments in which seed were stratified in sand did not yield definite indications as to the efficacy of this treatment.

## St. Lawrence University Establishes Second Demonstration Forest

A second demonstration forest has been established by the forestry department of St. Lawrence University, Canton, N. Y. The tract chosen for the purpose is one of 50 acres located on the Lake Road, 2 miles west of Sandy Creek, in Oswego County. A plantation of northern white pine and Norway spruce established eight or more years ago occupied 12 or 15 acres of the land at the time when it was purchased by the university. Under the direction of W. J. Endersbee, the forestry department's representative for the counties of Oswego, Jefferson, and Lewis, 30,000 trees were planted on the tract this spring. Half the trees were furnished by the New York State College of Forestry. Approximately 10 acres remain to be planted.

The trees planted this year are Norway and white spruce, northern white pine, Norway pine, Scotch pine, northern white cedar, Carolina poplar, and black locust. Roadways have been left between the various plots for the convenience of visitors.

## Oak-Hickory Woods Study at Purdue

A study of oak-hickory woods, designed primarily to determine the cattle-carrying capacity of the woods, is being made by the Purdue Agricultural Experiment Station and the Central States Forest Experiment Station. Eighteen plots about 20 feet square, on which a record of vegetation will be kept, have been established on the Pinney Purdue farm. Half these plots are subject to grazing and half are fenced. To determine the change in plant succession resulting from grazing, four meter-square quadrats have been established within each of the fenced and unfenced plots, on which about three counts will be made during each grazing season. Stanley A. Cain, of Butler University, Indianapolis, has charge of this phase of the study.



In appropriating \$475,000 for the continuation of three series of postdoctorate fellowships administered by the National Research Council the Rockefeller Foundation has provided \$90,000 for fellowships abroad in the biological sciences and special fellowships in forestry and agriculture. For each of the academic years 1932-33 and 1933-34 the board provides \$20,000 for the former and \$25,000 for the latter group of fellowships.

## How Windbreaks Can Be Grown in Nebraska

\* A plan by which ranchers in the neighborhood of Hyannis, Nebr., are successfully growing windbreaks by proxy is described in a letter to Extension Forester C. W. Watkins from Victor Bal, of Hyannis, as follows:

Since last year I don't plant anything else but western yellow pine. They are harder to get started than any other pines, but they are worth ten times more than any other pine for windbreaks in this territory.

About this time of year I sign a contract with the rancher to plant generally 500 bull pines [western yellow pines] next spring. I agree to furnish the trees, from 12 to 18 inches high, plant them, take care of them the whole summer, and cultivate and water them, and the rancher agrees that next fall, about the 1st of October, he will pay me \$1 for each living tree. If any of the trees die during the summer it is my loss. I have had as many as 460 living out of 500 planted. If I get good trees I don't generally lose more than 10 per cent and sometimes lose less.

Early in the spring, in March, I go over the ground to be planted and put in every mouse or gopher hole some poisoned wheat. As this time of year the mice and gophers are coming out very hungry, they eat the wheat eagerly, and in this way I poison most of them and save many trees. Then in April, a few days before the trees arrive, I plow the ground, always from west to east and throwing the dirt to the south. In this way I get very good protection against the summer sun and winds. I plow two furrows for each row of trees, and plant each two rows 10 feet apart and trees 10 feet apart in rows, offset in every row. After the ground is plowed and the trees arrive I watch the weather, and as soon as the days are cloudy or rainy I start to plant them. I have one hired man to dig the holes for me and carry a few buckets of water. I put the tree in the hole, spread the roots, fill the hole half full with dirt, and then pour in about 1 quart of water. This is very important, as it will make the dirt stick to the roots. Then I fill the hole about three-fourths full of dirt and pack it solid. After that I put a little loose dirt on top to hold the moisture.

About a week after planting I do the first hoeing with a heavy garden hoe, hoeing about 1 foot around the tree and at the same time building a little pit or basin around the tree about 1 foot in diameter and about 4 inches deep to hold the rain. Right after this I put a couple of shingles around the tree, one on the south side and the other on the west side, as close together as possible and slanting a little over the tree. This is very good protection against hot sun and winds and also hail. Once the trees are planted and protected, all that is necessary is to hoe them, and sometimes to water them. I hoe them about once in May and once in June, and then once every two weeks in July, August, and September. I also hoe after every heavy rain, as the rain makes a crust on the ground which has to be hoed and pulverized to hold the moisture.

With care like this I don't lose very many trees except by hail. The trees look very healthy and get an early start, and when 5 years old they are 6 to 8 feet high. I have some trees, bull pines, which are 12 years old and over 25 feet high.

Some of the ranchers want me to take care of the trees the second year, as they are generally very busy haying in summer and can't very well take care of these trees. So we make a new contract by which I agree to take care of the trees the second summer for 20 cents per tree and guarantee them to grow. If any

tree dies during the summer I agree to pay the rancher \$1 for it. Of course, very few die the second summer. I plant only 2,000 trees each year, as that is all one man can take proper care of during the summer.

## Oklahoma Erosion Study and Terracing Experiment

An erosion study by the Oklahoma Agricultural Experiment Station, covering 48 of the 77 counties in the State, revealed serious danger from both gullying and sheet erosion. Land with rough topography was found to have suffered an erosion damage more severe than that noted on comparatively level land in the same rainfall belt. In the first five months of 1930, during which the rainfall totaled 19.9 inches, a field farmed in cotton without any winter cover crop lost 15.9 tons of soil per acre. The loss during the same period from a field of oats was only 3.9 tons per acre, and the loss from a field of sweetclover was only 0.5 ton per acre. At the Panhandle (Okla.), station, crop production on plots of terraced land showed a 5-year average increase of 23.6 per cent in the period 1926-1930. The terraced plots now in operation have vertical intervals ranging from 3 inches to 12 inches on land with an average slope of 0.7 per cent.

## Planted Elm and Hackberry Successful in Western South Dakota

Elm and hackberry planted in 1916 on the Vivian farm of the South Dakota Agricultural Experiment Station have developed into an effective demonstration of successful planting of trees for shelter in western South Dakota. The farm is located at Vivian, 50 miles west of the Missouri River.

Together with the elm and hackberry, there were planted in 1916 some cottonwood and a hedge of caragana. All the trees started successfully and made notable growth for several years. In 1924, however, it was found that all but one of the cottonwoods had died during the previous winter. The elm and hackberry had by that time attained sufficient size to occupy all the available tree space in the plantation. In July, 1930, the grove contained 40 elm and 40 hackberry trees, 16 feet apart in rows 15 feet apart. At the age of 14 years the trees were approximately 9 inches in diameter at the base and stood 20 feet high. They were thrifty in every respect. The caragana were similarly thrifty.

The trees in the Vivian farm grove are cultivated in such a manner that the soil is thrown into a ridge between the rows, causing moisture to drain toward the trees. A steel road drag proved unsatisfactory for this purpose, because it was too long and so failed to throw the ridge in the center of the space between rows. The desired result has been obtained by the use of a drag constructed by Frank Hussey, farm foreman, in which two 2 by 6 planks 6½ feet long are set nearly upright for blades.

## Utah Farmers Show Increasing Interest in Forest Planting

The Utah State Agricultural College, in cooperation with the United States Department of Agriculture, distributed 15,800 forest trees to farmers this spring. Approximately two-thirds of the trees were hardwoods, which grow very successfully in the State. There is ample opportunity to produce in Utah farm woodlands all the hardwood timber that will be required for use on the farms, says Extension Forester Charles M. Genaux. A growing appreciation of the need for more extensive tree planting on farms is reported by Mr. Genaux, who writes: "Wagon tongues, doubletrees, plowbeams, and numerous other wooden articles that are bought by farmers from the lumber yards are extremely high priced in this State. In many cases the freight on this material from the eastern points of manufacture is greater than the cost of the material itself. On top of this, most of the material received here is distinctly inferior in quality."

## Chemical Treatment Stimulates Germination of Maple Seed and Acorns

Dormant seed of sugar maple and Norway maple and acorns of black oak and red oak were stimulated into germination by treatment with solutions of thiourea and ethylene chlorhydrin and by the vapors of ethylene chlorhydrin, in experiments reported by Carl G. Deuber, of the Osborn Botanical Laboratory, Yale University. With the maple seed, immersion in a 3 per cent solution of thiourea for one minute proved the most successful treatment. The solution was drained off the seed, the bottle stoppered, and the seed allowed to stand for a day before being planted. Immersing the seed in 3 and 6 per cent solutions of ethylene chlorhydrin (made by mixing 6 and 12 milliliters, respectively, of ethylene chlorhydrin, technical, with 194 and 188 milliliters of water) also was effective. When the seed had been immersed for a minute the solution was poured off. The seed then remained in the stoppered bottle for 24 hours before being planted.

With black-oak and red-oak acorns consistently good results were obtained by subjecting 50 to 100 acorns in a liter wide-mouth bottle to the vapors of 4 milliliters of ethylene chlorhydrin, technical, for 24 hours. The chemical was placed on a 5-inch square of cheesecloth suspended from the stopper. Acorns gathered in October and subjected to this treatment began to germinate within four weeks. Within 10 weeks, more than 70 per cent of the treated acorns had germinated, while the acorns not treated showed 1 per cent germination or none. Immersion of acorns in a 3 per cent solution of thiourea for 15 minutes was effective but took effect more slowly than the ethylene-chlorhydrin-vapor treatment. Germination in acorns treated with thiourea solution did not start until the seventh to tenth week after treatment.

In the tests on which this report is based more than 9,000 maple seed and 5,000 acorns were used.



The University of California had 100 forestry students enrolled during the spring semester of 1931. There were 22 graduate students, 17 seniors, 26 juniors, 20 sophomores, and 15 freshmen. The preponderance of juniors is due to the number of men now coming from the junior colleges. Of the graduate students, 13 had received their bachelor's degrees from other institutions.



Extension Forester D. E. Lauderburn, of Mississippi, is making it his practice to provide Mississippi farmers with information regarding prices and markets for farm timber. The information is obtained through correspondence with mills and wood-using plants. It is relayed to farmers through county agents and is also circulated by the Mississippi Agricultural Service Department. The mimeographed market report which Mr. Lauderburn distributed under the date April 20, 1931, contained information regarding 19 different timber species.



Growth rings in a cypress tree recently cut in the Amite River Swamp, in lower Livingston Parish, La., indicated that the tree was 1,300 years old, reports Extension Forester Robert Moore. The tree had a merchantable length of 86 feet 8 inches, a stump diameter of 92 inches, and a volume of 16,175 board feet. It was sound throughout. The tree was the property of the Lyon Lumber Co., Grayville, La.



A black locust tree recently cut by J. P. Munson, of Ithaca, N. Y., made more than 50 cents a year for its owner, reports J. A. Cope, New York State extension forester. The tree yielded 70 fence posts, each 6 feet 9 inches long. Valued at 25 cents each, the posts were worth \$17.50. A count of annual growth rings in the fresh stump showed that the tree was 30 years old. Mr. Cope considers this tree exceptional, but adds that a plantation of black locust established on good soil for fence-post production promises to be a sound investment.



Sixteen Eagle Scouts of New Hampshire were selected to take part this summer in opening the Valley Way Trail on the White Mountain National Forest, a section of one of the through routes to the summit of Mount Washington and to the northern peaks of the Presidential Range. It was planned to have the boys work one month, beginning July 6, the Forest Service providing tentage, tools, equipment, and food.

## New Hampshire Four-H Club Members Plant Trees and Compete in Forestry Judging

During the last six years more than 3,000 New Hampshire boys and girls have planted a total of 1,500,000 forest trees, writes Extension Forester K. E. Barraclough. If all these plantings could be brought together in one block they would compose a young forest of 1,500 acres. In the spring of 1931 Four-H club boys and girls of the State planted 360,500 trees, Smith-Hughes School students planted 38,850, and Boy Scouts raised the State's total for juvenile planters to 400,000. The planting stock used consisted of 3-year root-pruned seedlings and 4-year transplants obtained from the State forest nursery at Gerrish, N. H. The State forestry department provided trees to be planted on land of parents, relatives, or guardians, allowing 500 each to boys or girls between the ages of 9 and 15, inclusive, and 1,000 each to boys or girls aged 16 to 20, inclusive.

In most cases the trees were brought by truck from the nursery to a point in the center of the county where children congregated to receive trees and planting instructions.

Forestry judging contests for Four-H club members, designed to test knowledge of planting, weeding, pruning, and thinning, were scheduled for June and July in 10 counties of New Hampshire. Contestants were to decide what treatment should be given to each of 25 tagged trees. In the county semifinal contests

200 boys and girls took part. A team of three members selected from each county will take part in a State contest to be held at Durham on August 10, during Farmers' Week. The members of the winning team are to receive gold medals given by the Society for Protection of New Hampshire Forests.

To the champion Four-H forestry club of New Hampshire W. R. Brown, of Berlin, N. H., will award a \$50 cash prize this year, as he did in 1930.

## Connecticut Forestry Demonstration Contest

Connecticut boys and girls aged 10 to 18 were invited this spring to register in a forestry contest the results of which will be decided after November 1. Contestants were offered their choice of three projects—thinning sapling stands of trees, weeding plantations, and planting trees. For each of the three operations the minimum plot size specified was one-half acre. Each contestant is required to submit a written report describing the plot and its condition before and after the work and giving an accurate account of time spent, quantity of wood cut, etc. The first prize is the bronze medal offered by the American Forestry Association, carrying a representation of the General Sherman Tree. Three second prizes of \$5 each will be given by the Connecticut Forest and Park Association, and it is hoped that county prizes may be awarded.

Connecticut sponsors of the contest include the State forestry department, the extension forester, and the Connecticut Forest and Park Association.

# Forest Service Notes

## North Dakota Reaches Out for a Forest

By C. G. BATES, United States Forest Service

That North Dakota may again have a national forest, and may have one embodying an extensive planting program similar to that of the Nebraska National Forest, seems probable. At any rate the Lake States Forest Experiment Station, working with a special appropriation, is going ahead to determine the possibilities. Five acres of pines and spruces were planted in the spring of 1931, in the hope of advancing by one year the time when a decision might be reached as to the suitability of the soil and climatic conditions for coniferous tree growth. At present the possibility of growing timber in North Dakota is indicated only by a few scattered trees within the sandy region. Plans are being laid to plant on a scale of about 100 acres per annum, testing many different species, different ages and grades of stock, etc., and making a careful study of

the results to determine just how successful planting on a larger scale might be.

A national-forest unit in the Bad Lands section of the State was abandoned in 1917.

As a matter of fact, planting appears to be more favored naturally in North Dakota than in Nebraska. The Dakota sand-hill region is much closer to natural forest conditions, with a partial cover of aspen, burr oak, elm, and many shrubby species; also, with approximately the same rainfall, it has an appreciably lower evaporation rate than the Nebraska area lying about 5° farther south. As in Nebraska, the occurrence of a ground cover of kinnikinnik suggests strongly the suitability of the site to western yellow pine. The nearness to the Lake States pineries suggests that Norway pine has an almost equal chance. Strangely enough, even the heavily wooded Turtle Mountains, a few miles north of the sand hills, are devoid of conifers. Practically the only question hinges on the occurrence of alkali, which may be present in sufficient quantities to prove injurious to conifers. The depressions where



this is likely to be most in evidence seem likely to favor white or western white spruce or some of the hardwoods.

The North Dakota lands that hold most promise for tree growth are the sand-dune areas. This fact is due to the greater availability of water in the sandy soils and the low rate of evaporation from such soils. Because of the low rate of precipitation in the region, soils that do not absorb moisture readily are definitely incapable of sustaining tree growth except under cultivation. Accordingly, the Forest Service will limit the projected experimental planting to an area composed almost entirely of dune lands. Such an area has been chosen in McHenry County, near Towner, in the central portion of the State. This county is almost entirely a sand area, a large part of it having been the bed of a lake in glacial times. While there is some good farm land and thousands of acres of low flat hay land where the sand has not been blown into dunes, the latter occur scatteringly over most of the county. In some sections sand dunes occupy tracts of several square miles each, which have no agricultural use other than very low-grade grazing.

Pending legislation that would permit purchase of North Dakota land for national-forest purposes, the Lake States Forest Experiment Station is conducting initial trials on land set aside by the State for the use of the North Dakota School of Forestry, and will build headquarters on a small tract to be given to the United States by the commissioners of McHenry County. The State school of forestry, of which F. E. Cobb is president, is actively cooperating with the Forest Service in this undertaking, and will grow the trees required for the experimental planting in its nursery at Bottineau.

The possibility of successful forest planting has attracted widespread public interest in North Dakota, especially among those having a knowledge of the agricultural limitations of the sand-hill areas. That a national-forest enterprise will greatly stimulate interest in tree planting on the farms of the State can hardly be questioned. Tree planting on farms has been going ahead steadily with the assistance of both the State forester and the Northern Great Plains Field Station at Mandan, which operates a separate nursery for the production of stock for windbreak planting. The Lake States station will in no way compete in this established activity, but will, during the next year or two, conduct an intensive study of the value of windbreaks.



By recess action of the National Forest Reservation Commission the purchase of 16,558.3 acres of land in 21 national forest purchase units was approved June 1. All the cases involved are small, averaging about 100 acres. The costs approved average \$3.18 per acre. These purchases affect landowners urgently in need of financial assistance.

## Damages Awarded in Fire Trespass Case Cover Cost of Restoring Timber Stand

The value of young timber killed by fire is measured by the cost of restoring the burned area to the condition it was in prior to the fire, according to rulings by the United States District Court at Coeur d'Alene, Idaho, Judge Charles C. Cavanah, in the case of the United States *v.* Blackwell Lumber Co. Evidence was admitted both as to the cost of planting the area involved and as to the cost of protecting the area until a stand of like age with that destroyed is reproduced. The court held also that when Government property is in danger it is the duty of the Government to protect it and that national forest officers are not obliged to delay their attack on a forest fire pending action by owners of adjacent private land to extinguish the fire. The case arose in connection with the Charlie Creek fire, which spread from lands of the lumber company to the St. Joe National Forest, Idaho, in August, 1929. Damages of \$9,308.60 were awarded to the Government to cover the cost of fighting the fire and the value of the tree growth destroyed by the fire.

The Charlie Creek fire started in logging slash along a Blackwell Lumber Co. logging railroad south of Emida, Idaho. It burned over approximately 2,284 acres, including more than 700 acres of the St. Joe National Forest. The Government area burned was occupied chiefly by western white pine reproduction averaging 38 years in age. About 300 fire fighters were employed in putting out the fire, which was not subdued for several days.

The Government charged general negligence of the Blackwell Co. in allowing fire to spread from its land to the national forest, special negligence in failing to pile and burn slash concurrently with the cutting of trees along its logging railroad and in failing to dispose of slash on horse trails and rollways concurrently with the cutting of timber at those places, and negligence in operating an oil-burning locomotive without a spark arrester. It also charged negligence in violating the provisions of the Idaho forest law of 1925 relative to slash disposal on logging-road rights of way.

## Sawmill Waste in the Douglas Fir Region

Normal sawmill waste resulting from the manufacture of rough green lumber in the Douglas fir region during 1929 amounted to 619,065,157 cubic feet (solid measure), according to findings in a study made by A. H. Hodgson, of the Portland (Oreg.) office of the Forest Service. Of this total, 44 per cent was recovered and sold as by-products, 29 per cent was used by the sawmills themselves as fuel for the production of domestic power and live steam, and 27 per cent was destroyed in the refuse burners. The total sale value, f. o. b. sawmill, of all by-products made in the region in 1929 from normal sawmill waste and from sawmill waste in excess of normal amounted to \$8,196,554,



## Use of Power Pumps in Region Seven

By H. O. STABLER, United States Forest Service

In the Eastern National Forest Region our experience in the use of power pumps is much less extensive than that of our big brothers of the West. The region's annual crop of fires for the 5-year period 1926-1930 was 1,112, of which more than 90 per cent were of the surface type as distinguished from ground or crown fires. Our ground fires are in the spruce and northern hardwood types of the Monongahela and White Mountain Forests, in the hemlock stands on some of the Appalachian forests, and in the "bay" type on the forests in Florida. During periods of summer drought the swamp areas along the streams in the Florida forests dry out and become subject to fires that are very difficult to extinguish. In such locations, since water is ordinarily available, power pumps are of great value. Fortunately but few fires occur on the White Mountain Forest; the forest is now equipped with pumpers, however, and these are relied upon to control duff fires wherever water is available.

Power pumps were of real value in controlling bad fires that occurred during the summer of 1930 on the cut-over spruce area of the Monongahela Forest. In October of 1930 a fire in Black Water Canyon on the Monongahela Forest gave us some excellent experience in the use of pumpers. The fire started along Black Water River and eventually involved approximately 40 acres along the canyon side, the upper edge of the fire being at approximately 800 feet higher elevation than the point of origin. This fire, starting in the late afternoon, was attacked by 7 p. m. Soon thereafter a pumper installed at the river was being used effectively on the lower edges of the fire. It was attempted to relay water from the river pump up the slope to a second pump. This effort met with poor success, and it was not until the following afternoon that a pump was established in a lateral stream of Black Water River at the upper edge of the canyon, within less than a quarter of a mile of the eastern edge of the fire. At this location water had to be lifted by the pumper a bare 100 feet before it could be turned over the rim of the canyon at any portion of the fire area which the length of the hose made accessible. Sufficient hose was not available at first, but in the course of 24 hours approximately 3,000 feet was on hand and water was placed directly on nearly all of the east, south, and west lines. Furthermore, hose was taken to the interior of the fire and was used effectively in extinguishing fire in the duff amid rocks and boulders and in keeping deadened rhododendron leaves from igniting. At no time during the life of this fire were burning conditions exceptionally good; but in spite of the fact that we had ample man power from the morning of the day following the start of the fire, it is problematic whether we could have controlled it and held it within the canyon without the use of pumps. If the fire had

escaped to the surrounding plateau, part of which had been planted to spruce, it would have reached large dimensions and plantations would have been destroyed.

We learned much from this Black Water Canyon fire, which was in an ideal location for the use of power pumps. Obviously the outstanding lesson brought home to local forest officers was the absolute necessity of knowing the location of the water supply in advance of the occurrence of a fire. Had a pump with 1,500 feet of hose been installed at the lateral stream during the early hours of the night when the fire started, the fire could surely have been held to an area of 10 acres or less.

Our second outstanding lesson, which is no less obvious than the first, was that as a measure of preparedness men must be trained in the use of pumpers. A pump is a wonderfully efficient little piece of machinery, but it requires a trained nurse who is expert in its operation.

Needless to say, the use of water is in no sense a substitute for a properly placed and adequately constructed control line. The pumper is merely a very efficient tool for holding a line already constructed, and in some instances for cooling down the fire so as to permit line construction. This I consider a very important point; all too often the tendency will be to rely too much on pumps and water and to pass up opportunities to stop the spread of fire by constructing a line.

## Graphic Charts for Lookouts Are Part of California Research Plan

In connection with its forest-fire studies, which center on the Shasta National Forest, Calif., the California Forest Experiment Station has provided several lookout stations on the Shasta Forest with graphic charts designed to assist the lookout men in systematic observation of their territory. The use of these charts is expected to contribute to better detection of fires and will result in the collection of data from which the experiment station hopes to learn something about visibility conditions.

Each chart was made on the scale of one-half inch to the mile, which allows an atlas-size sheet to represent an area of 20-mile radius. Concentric circles were drawn with radii representing distances of 5 miles, 10 miles, 15 miles, and 20 miles from the lookout station. North-south and east-west lines were drawn through the center of the chart. Next a series of natural features were indicated as observation targets, at varying distances from the lookout and at intervals through each quadrant. Typical targets are a forked tree, a brush patch, a large rock in brush, a ridge intersection. Care was taken not to select highly conspicuous features; it is desirable that the observer be obliged to scan the landscape with some care to pick out his targets. The distances were staggered so that as the eye passes from one target to another it is compelled to change focus,

which enhances the probability of picking up smokes at intermediate points.

The location of each target was plotted on the chart at the proper azimuth as determined by an alidade reading and at the proper distance from the lookout point as determined by reference to known topographic or cultural features. A small sketch of each target was made on the chart, and a description of the target was printed at one side of the sketch. A line tipped with an arrow was drawn from each target sketch toward the center until it intersected the next distance circle, and along this line the correct azimuth reading was printed in blue ink. The sketches of the targets were numbered in red, in clockwise sequence, for convenience in recording visibility.

Eight targets were chosen in each quadrant, or 32 in all, unless vision from the station was restricted in some direction.

Lookout men using these charts make and record observations every 15 minutes. Visibility conditions are recorded under three heads—plainly seen, dimly seen, and not seen, indicated by P, D, and X, respectively. In a test the time required for this systematic observation and recording was about seven minutes. Familiarity gained by practice is expected to reduce the time requirement to five minutes.

## Northern Rocky Mountain Experiment Station Enlarged

Plans have been approved for concentrating in the Federal forest experiment station at Missoula, Mont., responsibility for all the organized research work of the Forest Service in the Northern Region. This work includes the silvicultural research which the experiment station has carried on under the directorship of R. H. Weidman and the forest products investigations directed by M. I. Bradner, of the regional office. To these are to be added forest survey and range investigative activities for which Congress recently made appropriations. The enlarged station will be headed by L. F. Watts, now in charge of the silvicultural work of the Intermountain Forest and Range Experiment Station, at Ogden, Utah. It will be known as the Northern Rocky Mountain Forest and Range Experiment Station.



Tree species growing in the arboretum developed by the Pacific Northwest Forest Experiment Station at the Wind River nursery, Columbia National Forest, Wash., now number 132. In general there are about 20 specimens of each kind of tree planted. The established groups include 37 pines, 10 spruces, 9 balsam firs, and 40 different broad-leaved species. This year 25 lots of coniferous seed were sown in the nursery for future arboretum stock.

## Kaibab Investigation Leads to Confirmation of Forest Service Policy

By C. E. RACHFORD, United States Forest Service

"There exists an urgent need for reducing the present number of deer in the Kaibab area to a point below the present limited carrying capacity of the range and maintaining the deer herd at such a level until such time as the various species of shrubs and young trees upon which the deer depend for browse are reestablished." In these words the committee recently appointed to investigate conditions on the Kaibab National Forest, Ariz., confirms a conclusion which was arrived at by the Forest Service as early as 1920 but which has repeatedly been questioned.

To bring about a definite settlement of differences in points of view regarding the Kaibab situation, the Forester this year invited a number of organizations interested in wild life and related subjects to select representatives who should serve as a committee to study the situation on the ground. As a result a committee representing some 12 organizations visited the Kaibab Forest June 8 to 15, 1931. It will be recalled that a similar committee made such an investigation in 1924 and recommended that at least one-half of the deer be removed at once. The members of the 1931 committee and the organizations they represented were as follows: T. Gilbert Pearson, National Association of Audubon Societies; George D. Pratt, American Game Association, American Forestry Association, and Camp Fire Club of America; Mark Anderson, Izaak Walton League of America; Joseph S. Dixon, National Park Service; E. Raymond Hall, American Society of Mammalogists; K. C. Kartchner, Arizona Game and Fish Commission; J. M. Macfarlane, American National Livestock Association; A. A. Nichol, University of Arizona and Arizona Game Protective Association; and Paul G. Redington, United States Bureau of Biological Survey.

The committee was accompanied by officers of the Forest Service, the Biological Survey, and the National Park Service, and by representatives of the University of Arizona, the National Woolgrowers Association, and cattlemen of the vicinity. Altogether, 28 individuals were present during all or a portion of the investigation. The report of the investigation indicates that in the 8-day period June 8 to 15 the committee traveled approximately 650 miles and observed practically every forest type and condition within the Kaibab Forest. That the investigation could be completed in such a short time demonstrates careful planning and speaks well for road and transportation facilities on the forest.

The Kaibab area, in the words of the committee, is "bounded on three sides by cliffs which almost everywhere are wholly inaccessible, and on the remaining side an inhospitable desert completes the total isolation of

the area so far as the big game of the region is concerned." Although 15,000 cattle and horses and some 5,000 sheep were grazing on the area in 1913, the committee finds that at present domestic animals "have been reduced to almost insignificant numbers, considering the size of the area."

Following up its statement that there has been much loss to the Kaibab deer herd owing to starvation on the winter range, the committee explains as follows one of the main causes of the general misunderstanding of the Kaibab deer situation:

It is a curious fact that there are some regions on the Kaibab where forage for deer still persists to considerable extent that is little utilized by these animals. The mule deer is very local in its range, and many die of starvation within a few miles of food that might be secured if they would only travel a short distance from their natural habitat. For example, this is especially noticeable on the northern part of the Kaibab Plateau, which is traversed by the main road over which visitors usually come into the Kaibab. A traveler entering from the north may see beside the road areas of cliff rose bearing leaves within reach of the deer. Also here and there are patches of locust, oak, and even a limited amount of low aspen. The casual visitor, therefore, may readily get the erroneous idea that there is still much forage for deer in the entire region, and that all is well with the deer. This idea is further accentuated when the large number of deer are observed feeding in the meadows of VT and Little Parks.

One must go back into the forest and down onto the winter range areas to get a real appreciation of the general lack of forage. Absence of sufficient water is one of the reasons why the deer do not use the north end of the plateau in summer. The mule deer seem to have very fixed habits of going to certain areas for winter regardless of whether or not sufficient forage is available.

For many years the Forest Service has held that numbers of all classes of animals on a national forest area should conform to the productive capacity of that area. The principle is definitely recognized in the following statement by the committee:

It is desirable to have as many deer within the Kaibab Forest as the available forage supply will permanently support, not only that these deer may serve as a great tourist attraction but in order that the surplus may be utilized by man.

Perhaps the committee's most significant statement concerning the present condition of the range is the following:

It is the conclusion of the committee, after carefully reviewing the general condition of the Kaibab range, and also observing the degree of recovery within the fenced experimental plots, that the Kaibab area is not now producing more than 10 per cent of the available and nutritious forage that this range once produced.

Present conditions and their causes, with suggestions for their amelioration, are presented as follows:

No doubt the entire accessible Kaibab area has suffered at least two periods of severe range depletion—first by domestic grazing animals, and then by deer. \* \* \*

The forage of the entire Kaibab area is yet in a deplorable condition and, with the exception of the east side winter range, it is doubtful whether there has been any

considerable range recovery due to the reduction<sup>1</sup> of the deer herd. \* \* \*

The committee considers the total lack of aspen reproduction, the continuous browsing of conifer species, and the deterioration of the best remaining browse species an indication that the deer are still so numerous as to make range recovery impossible. We therefore recommend that supervised hunting be continued and that a removal not less than that of last season, including both sexes, be effected this fall by licensed hunters or by other legal methods.

Cattle and horses are mainly grass eaters when grass is available. Deer, on the other hand, prefer weeds and browse. There is, however, conflict in the use of forage as between cattle and deer when utilization is carried to the extreme. Cliff rose is one of the valuable and originally abundant browse species that has suffered greatly from a double use by both deer and cattle on the winter range of the Kaibab. It is desirable, therefore, as a measure of range restoration, to eliminate unauthorized cattle as well as to reduce the deer to a point where these choice browse species will be able to recover. It is also apparent that if overgrazing continues the aspen forest type will ultimately disappear from the Kaibab Plateau. There is practically no aspen reproduction anywhere now. A very few yellow pine seedlings are "getting away" out of reach of the deer. Conifer reproduction within the Kaibab under present conditions is virtually impossible. Practically all pine, spruce, and fir reproduction has developed a peculiar Kaibab form, due to repeated browsing of terminal buds by the deer.

The committee emphasizes the fact that the Kaibab National Forest and the Grand Canyon National Park form a biological unit and that the policies under which the two areas are administered should be closely coordinated. Range depletion, it points out, is generally as serious within the park as within the forest. The committee approves cooperative plans such as those now in effect between the Forest Service and the State of Arizona, and records the opinion that there is a need for more coordination and cooperation among Federal bureaus concerned with the biological and economic problems affecting the management of Federal lands and the plant and animal life produced thereon. Expansion of research through the use of facilities and personnel of State colleges is recommended.

Final recommendations of the committee call for additional man power for field administration; restriction of domestic livestock grazed on the area to present numbers so long as the range remains in a depleted condition; reduction of the number of deer to a point considerably below the present limited carrying capacity of the range, and maintenance of the herd at that level until such time as the various species of shrubs and young trees are reestablished; after the range is restored to normal productivity, allowance of such increases in the number of deer as the natural food supply may sustain; leaving undisturbed on the area all forms

<sup>1</sup> Since 1924 the State of Arizona has been issuing licenses to hunters to kill deer on the Kaibab National Forest. In the period 1924-1930 more than 12,600 deer were killed by licensed hunters. The total number so removed in 1930 was 5,033. In 1928, 1,124 deer were killed by Government hunters. In addition, a few have been shipped out by forest officers for use in stocking other areas.

of native wild animal life other than deer, except for scientific purposes or where serious damage is being done to private property; continuance of suspension of State and Federal predatory animal control and closure of the area to private trapping and hunting of flesh-eating animals until the deer herd is adequately reduced.

Obviously, the report of the committee is most gratifying to the Forest Service. It marks a milestone in cooperative action, attests the soundness of the service policy, and indicates the need of extending the plan to other areas where similar conditions are known to exist.

## Forest Economics in the Kentucky Mountains

By RONALD B. CRAIG, United States Forest Service

To find an area of nearly 170,000 acres in the eastern United States on which the net annual forest growth exceeds the total annual cut nearly 3 to 1 might seem an impossibility to those who believe that our eastern forests were long since depleted. Such an area exists, however, in Knott County, Ky., and in the summer of 1930 was made the field of an intensive land economic survey in which the Forest Service collaborated with the Bureau of Agricultural Economics, the Bureau of Home Economics, and the University of Kentucky.

Knott County lies in southeastern Kentucky, near the Virginia line, on the maturely dissected Cumberland Plateau. Elevations range from 700 to 2,300 feet above sea level. The county is characterized by steep slopes, narrow V-shaped valleys, and extremely narrow ridges which in places become true hogbacks. Timberland makes up 75 per cent of the county's area. The remaining 25 per cent is in use for crops, pasture, and residential purposes. The total area is 226,800 acres, and the population (as of 1930) is 15,430 or 43 per square mile.

The forests of the county are about 95 per cent hardwood. Hickory is the commonest species, followed by numerous species of oak, the two genera together forming 63 per cent of the total number of trees on the plots measured. Beech and yellow poplar together form 15 per cent of the total number, and red maple 7 per cent. The remaining 15 per cent include a large number of species, no one of which forms more than 3½ per cent of the total. The softwoods are hemlock, yellow pines, and cedar. Altogether, 63 arborescent species were found, of which 35 are of general commercial importance.

The present total stand is about 1,250,000,000 feet board measure; but about 460,000,000 feet of this is defective, owing to past fires and to the chestnut blight. Of the 790,000,000 feet of sound timber, 65 per cent, or 511,000,000 feet, is of merchantable size. The average stand of all types and age classes has a volume of 4,700 board feet per acre and a net annual increment of 140

board feet per acre. The net annual increment for the whole county is 24,400,000 feet board measure.

Utilization of this forest resource is still more or less desultory. Except on small areas immediately adjacent to the mines in Yellow Creek and Beaver Creek, most of the lumbering is done by resident farmers owning a small portable mill which they operate only when a neighbor brings in a load of logs or when they have a sure market for a certain type of product. There are a few purely commercial mills in the county, but most of these are under contract to a near-by mine. The average annual production of forest products for the biennium 1929-30 was 6,614,000 feet board measure, of which crossties formed 294,000 feet and staves 840,000 feet, the balance being lumber and sawed mine timbers. The total annual drain on the forest, including not only the products just listed but round mine timbers, fuel wood, timber used for farm maintenance, and waste, is about 8,400,000 board feet. This is only 34 per cent of the net annual increment. There is no threat of a timber famine in Knott County, Ky.

The picture of the county's agriculture is very different. Because the area of good bottom-land soil is extremely limited, it has long been the practice to crop the steep slopes to corn. Inasmuch as the soil is a sandy loam with a clay subsoil, this results in very rapid sheet erosion and even some severe gully erosion, and in consequent loss of soil fertility. The farmer is then compelled to clear additional forest land farther up the slope, where erosion is even more rapid. The end result, now beginning to be very apparent in most sections of the county, is a soil condition in which it costs nearly as much to produce a bushel of corn as can be realized from its sale. In many areas the production cost of corn is much greater than its sale value. If this practice continues, another two or three decades will see the end of all profitable corn production, save on the limited area of bottom land. Corn is the principal cash crop now raised. Diversified farming might help the county's land-utilization problem, but it will not solve it.

The existence of these two conditions—forest resources virtually untouched and agricultural soil rapidly approaching depletion—seems to indicate the need of a change in the people's source of livelihood. Coal mining and the development of gas and oil wells are the only industries now in operation in the county, unless the manufacture of a small quantity of raw lumber be included in that classification. The greatest opportunity for improving the people's present standard of living lies in the development of wood-using industries, such as the manufacture of furniture, veneers, novelties, and wood pulp. It is probable that the coal, oil, and gas fields within the county will be more intensively developed within a few years, which would aid the people to obtain a better living. The only barrier to the success of such an undertaking is the

lack of good roads or a railroad. The existing highways are totally inadequate for the needs of the county and must be extensively improved if the county is to progress at all. Once this is done, it should not be difficult to capitalize the appeal of this region to the manufacturer of wood products. Raw materials, fuel, power, and skilled labor are all here in abundance and at low cost. With such a combination a live manufacturer should be able to compete successfully in the national market.

Here, then, is an area where the forest problem is one not of past overexploitation but of present underutilization. In respect to volume per acre, annual growth, and present utilization, Knott County is typical of most of the Cumberland Plateau region of more than 1,500 square miles, except for those portions adjacent to railroads. The possibilities in this region for the immediate practice of at least an elementary form of forestry appear to be excellent, not only from the standpoint of silvicultural theory but from that of profit to the timber owner.

## National Forest Timber Sales to Be Restricted During Economic Depression

A revised timber-sale policy put into effect by the Forest Service on May 19 at the instance of President Hoover, to be effective while the present economic depression continues, places restrictions on sales of timber the value of which exceeds \$500. Such sales will be made only to supply the needs of already existing saw-mills that are dependent upon the national forests for their raw material and can not obtain their raw material elsewhere; to furnish domestic paper mills with raw material needed to supply the domestic market with newsprint and other wood-pulp products; and to dispose of wind-thrown, fire-damaged, or fire-killed and insect-infested timber. The exception concerning pulpwood is due to the fact that more than half the paper consumed in the United States originates, as wood, in other countries, from which it is imported as either pulpwood, wood pulp, or paper.

The Ozark nursery of the United States Forest Service, established near Russellville, Ark, on land belonging to the Arkansas Polytechnic College, has been enlarged this year from 1.04 acres to 3.87 acres. If longleaf pine seed is available it is planned to sow it this fall in sufficient quantity to produce 1,000,000 or more seedlings. A nursery building 16 feet by 30 feet, with a concrete floor and a storage loft, was erected early in 1930. Mourning doves and English sparrows have been very troublesome at this nursery, so that it will be necessary to provide bird screens for all beds.

## Recovery of Western Yellow Pine From Browsing Injury

A western yellow pine in its second year will probably survive browsing injury if a fascicle of permanent leaves or several of the younger primary leaves are left, according to findings of the Southwestern Forest Experiment Station. If only a few of the older primary leaves or cotyledons remain the plant may be expected to die, because the primary leaves are short lived and soon fall off. If the stem is bitten off so low that all the leaves are removed, death of the plant is certain.

These conclusions, drawn from field observation, were confirmed through tests made with seedlings 1½ years old growing in drills in nursery beds. Three rows of seedlings were cut back on July 30, each row in a manner simulating a different degree of browsing injury, and other rows were so treated on September 15. In the following May no appreciable difference was observed between the trees treated in July and those treated in September, other than the difference due to the fact that of the surviving plants those treated in July had had more time to put on new growth following injury. All seedlings surviving injury had formed small shoots or buds below the point of injury. By the following August all the seedlings of which the current shoots had been cut back to stubs about ½ inch long, and the surviving seedlings from which the entire current year's shoot had been cut off, leaving only a rosette of primary leaves on the old stem, had made substantial growth but had formed no definite leaders.

Field observations in the western yellow pine type on national forests of the Southwest have led to the conclusion that tree seedlings are rarely injured by either cattle or sheep during the year of germination.

Beech, elm, and ash seed are observed by the Central States Forest Experiment Station to be unusually plentiful this year through Ohio and Indiana. A statement by Joel Kinkaid, of Warsaw, Ind., that beech trees in northern Indiana were heavily laden with seed in 1909, the year following a great drought, has given rise to speculation as to whether changes in the carbohydrate-nitrogen ratio as a result of drought may lead to the production of heavy tree-seed crops.

On a forest area of the Clemson College Coastal Experiment Farm near Summerville, S. C., that has been burned over every year for 13 years, individual longleaf pines have made about 15 per cent less diameter growth and about 25 per cent less height growth than trees on adjacent unburned land, according to measurements taken by the Appalachian Forest Experiment Station.

## Summer-Wood Formation in Southern Pines Dependent on Capacity of Soil to Retain Moisture

The quantity of summer wood formed by longleaf pine trees growing in the deep, sandy soils of the Choctawhatchee National Forest, Fla., is correlated fairly closely with the quantity of soil water currently available, according to the results of a Forest Products Laboratory experiment carried out in 1927, 1928, and 1929. Groups of trees were irrigated for three years, and by means of increment borings the width of the summer-wood portion of growth rings formed during the irrigation period was compared with the average for summer wood formed in the 14 preceding years. It was found that during the experimental period annual summer growth had increased by 89.9 per cent in trees irrigated from March to July only, by 94.6 per cent in trees irrigated from July to December only, and by 165.9 per cent in trees irrigated throughout the growing season. On the check plot an increase of 24.3 per cent was observed in summer wood formed annually during the experimental period.

Although irrigation of the southern yellow pine forests is not practicable, the results of this experiment do lead to certain recommendations in regard to the management of such forests. To promote greater growth and the production of heavier and stronger wood, it is advised that efforts be made to maintain forest soil conditions such as will bring about the retention of moisture and make moisture continually available to the trees. In the southern pine region this is not a matter of conserving an inadequate water supply; usually, rainfall is abundant. Measures that would increase the organic content of the soil, the soil fertility, and the capacity of the soil to retain water are the exclusion of forest fires, a satisfactory stocking of forest areas, and an admixture of broad-leaved species with the conifers.

Concurrently with the experiments just described and on the same site, complete fertilizer was applied to trees without water other than the natural precipitation. This appeared to increase the trees' rate of diameter growth to a slight degree, but appeared to have less influence on the development of summer wood than on that of spring wood. A nitrate fertilizer without irrigation increased growth and especially the development of summer wood. In both cases it is likely that the unusual abundance of soil moisture available in 1928 and 1929 had as great an effect upon the growth of the trees as the fertilizers.

A count of the cones borne by the trees on the irrigated and the fertilized plots in 1929 indicated that cone production was stimulated by the treatment given, especially on the fertilized plots.

The site of these tests was an area of about 10 acres on the east bank of Garnier Creek, approximately

8 miles north of the Gulf of Mexico. The soil was a deep and nearly sterile Norfolk sand, which when tested showed only traces of available nitrogen and phosphorus. The longleaf pines, which, with oak sprouts, formed the only tree growth, were from 100 to 250 years old. They were 60 feet tall and ranged from 6 to 22 inches in diameter at breast height. When the root systems of trees near the experimental area were exposed by washing away the soil with water, it was found that by far the greater portion of the longleaf pine roots occupied the upper 18 inches of the soil. In this layer root competition was obviously very keen. Moisture determinations made two days after a 1-inch rainfall showed a moisture content of only 2½ per cent at depths to 6 feet; similar tests two days after a 3-inch rain showed the moisture content at the same depths to be about 5 per cent. Since 1913 the region has had an average annual rainfall of 60 inches or more; but seasons of extremely low rainfall occur, and the precipitation at times consists largely of heavy rains at infrequent intervals. The low moisture capacity of the sandy soil and the high summer temperatures bring about conditions not much more favorable for growth than those existing in semiarid regions.

## Portions of Deschutes Forest Designated as Experimental Forest and Natural Area

A tract of 7,520 acres to be devoted to experimental use by the Pacific Northwest Forest Experiment Station has been set aside in T. 21 S., R. 9 E., on the Deschutes National Forest, Oreg., about 40 miles from Bend, Oreg. The area will be known as the Pringle Falls Experimental Forest. In climate, soil, and physiography it is typical of a long belt of western yellow pine land, and its timber is representative of a large territory of commercial pine forest in central Oregon. Besides containing mature western yellow pine it takes in lodgepole pumice flats characteristic of the country and some mixed conifer or sugar-pine type, the latter on buttes which rise about 800 feet above the general level. Located on a fair road, 6 miles from the Dalles-California State Highway, the tract is easily accessible throughout the year except at times of extreme snowfall. Small timber sales could conveniently be made on it at any time irrespective of large logging operations in the region, the cut being transported either by truck to a common-carrier railroad 7 miles away or by river driving.

Likewise on the Deschutes Forest, a unit of 1,440 acres in T. 12 S., R. 9 E., W. M., adjoining the Metolius River recreation strip, has been designated as the Metolius Natural Area, and is to be retained, so far as practicable, in an unmodified condition. This area lies within the Metolius River watershed, east of the river and about 5 miles below its visible source. On more



than 90 per cent of the area the timber is considered as of the western yellow pine type, approximately 650 acres of this carrying commercial stands. The remainder is occupied by the mixed Douglas fir-white fir-western larch type, partly merchantable but not so classified at present from the practical logging standpoint. None of the area has been cut over, except very narrow clearings for old roads. Most of it has been burned over at one time or another, but there are no fresh burns and no barren areas. Elevation above sea level ranges from 2,800 to 4,800 feet. The soil is mostly of volcanic origin. The growing season is generally short. Reproduction sufficient for a complete stand is present practically everywhere on the area except under the denser groups of mature western yellow pine. The area is about 18 miles northwest of Sisters and 40 miles from Bend, and is readily accessible by a very good forest road following the east bank of the Metolius River.

## Positive Gas and Water Pressure in Oaks

By C. A. ABELL, United States Forest Service

Evidence of positive gas and water pressure in forest trees came to my attention during the late summer and early fall of 1930 in western North Carolina and northern Georgia hardwood forests. In connection with a growth study carried on by the Appalachian Forest Experiment Station, numerous forest trees were drilled with the increment borer. Frequently after the bit had been inserted 2 inches or more into a scarlet oak (*Quercus coccinea*) the tree would emit enough liquid to cause a dripping from the outer end of the borer. Often there was an accompanying hissing sound as if gas were escaping.

One 14-inch scarlet oak, apparently sound, was encountered that had water pressure enough to eject the 3-inch core with considerable force and follow it with a stream of liquid which was thrown 3 to 4 feet from the base of the tree. This liquid had the characteristic bad odor of scarlet-oak sap. The occurrence seems more remarkable because of the very dry season preceding it. At that time, late summer, the rainfall deficiency for the calendar year was 12.73 inches related to a normal of 40.28 inches.

The only two species in which inflammable gas was found were the chestnut oak (*Quercus montana*) and the white oak (*Quercus alba*). In some trees of these species, ranging from 8 to 16 inches in diameter at breast height, the positive gas pressure was sufficient to blow the core out of the hollow bit with considerable force. The gas was frequently lighted and would shoot a blue flame, sometimes  $1\frac{1}{2}$  to  $2\frac{1}{2}$  feet long, extending horizontally near the source but gradually curving upward to its tip. The flame would burn steadily for 30 seconds or so, then gradually lose force and become smaller. It was usually snuffed out soon

after it was lit, to preserve the temper of the borer. In all trees issuing inflammable gas the heartwood was unsound, apparently affected by a dry rot. Failing pressure could occasionally be revived by turning the borer a little farther into the tree. Sometimes the issuance of gas was stopped completely by turning the borer too far. The fact that the flame was blue suggested methane, a gas known to be produced in the decomposition of cellulose.

Lamar M. Wood, of the Michigan land economic survey, observed inflammable gas in white oak and in red oak (*Quercus borealis*) while working on timber-growth studies in West Virginia during the fall of 1927.

## Hogged Wood and Sawdust in Demand in Pacific Northwest

A study recently completed by A. H. Hodgson and E. F. Rapraeger has brought out the fact that during 1929 the sawmills of western Oregon and Washington produced and disposed of 4,289,062 units (1 unit=200 cubic feet) of hogged wood and sawdust. On the assumption that the fuel value of a unit of hogged wood and sawdust is equal to that of  $2\frac{1}{2}$  barrels of crude oil, it is estimated that the year's consumption was the equivalent of 9,650,312 barrels of crude oil.

The principal users of hogged wood and sawdust are sawmills, pulp and paper mills, and electric power companies. The following table shows the distribution of use of these commodities in 1929 within the region studied:

Class of consumers	Western Washington		Western Oregon		Total	
	Number of users	Consumption	Number of users	Consumption	Number of users	Consumption
		Units of 200 cubic feet		Units of 200 cubic feet		Units of 200 cubic feet
Sawmills.....	356	1,269,314	450	711,817	806	1,981,131
Pulp and paper companies.....	14	923,661	6	142,044	20	1,065,705
Power companies.....	2	195,914	8	456,662	10	652,576
Apartments and office buildings.....	150	81,308	65	11,000	215	92,308
Schools and public buildings.....	51	54,000	83	32,478	134	86,478
Residences.....	5,213	77,915	6,780	65,800	11,993	143,715
Others <sup>1</sup> .....	68	173,998	80	93,151	148	267,149
Total consumption.....		2,776,110		1,512,952		4,289,062
Total production.....		2,778,940		1,510,122		4,289,062

<sup>1</sup> Includes laundries, milk condenseries, packing companies, and creosoting plants.

Sawdust burners installed in residences now number 6,272 in Portland and 3,800 in Seattle.

Laundries and milk condenseries favor hogged wood as a fuel because of its thermal properties, availability, at low cost, and cleanliness.



## Sycamores Defoliated in Central States

Severe defoliation of native sycamore trees, in some cases almost complete, has been observed this year by the Central States Forest Experiment Station. Some injury was done to the trees by frost killing of the buds, and this has been accompanied by an attack of a parasitic fungus which works on the cambium layer of the

twigs, sometimes completely girdling the twigs. This injury has been observed from central Illinois to eastern Ohio and is so severe that in June many trees seemed to be on the verge of dying. The trees may recover through development of adventitious buds. The disease has tentatively been identified as sycamore anthracnose, which has been present in the region for several years.

# General Forest News

## Indian Service Lowers Cost of Opening Logging Railroad Grades to Motor Travel

It cost the Indian Service only \$26.74 per mile to transform abandoned logging railroads on the Klamath Indian Reservation, Oreg., into automobile roads on which a speed of 30 miles per hour can be maintained. Logging operations had covered approximately 175,000 of the 800,000 acres of timberland included in the reservation, and on this cut-over area remained a network of logging railroads spaced about one-half mile apart. The roads averaged less than 3 per cent in grade and in no case exceeded 5 per cent. Opening these roads to motor travel meant making all parts of the cut-over land accessible to fire-protection forces and developing a network of firebreaks.

In the spring of 1930 a "20 motor patrol," manufactured by the Caterpillar Tractor Co., was purchased for use in "blading" out the roadbeds following removal of the ties. In some places it was found necessary to blade the earth away to a depth of 14 inches in order to eliminate the "washboard" effect left when the ties were removed. The machine easily blades out a mile of road a day.

In some places the logging companies had removed the ties for use elsewhere. Where this had not been done the work of adapting the roads to motor travel was retarded because of the labor involved in removing approximately 3,675 ties per mile. This delay and the expense of the whole operation were greatly decreased through the use of a "tie-bumping machine" devised by Allen F. Space, in charge of road construction on the Klamath Reservation. This machine, described by Ranger Space in the 1931 Idaho Forester, published by the University of Idaho, is made of two pieces of 90-pound railroad steel and is attached to the front of the "motor patrol." One piece is a 7-foot "rooter," set 8 inches to the left of the center of the patrol, which pierces the earth 1 inch below the ties and, raising the ties from the roadbed, swings them to the right. The second piece is bent into a circular shape and extends over the right wheel of the motor patrol, reaching the ground 10 inches in front

of the wheel. This piece pushes the ties still farther to the right, after which the blade of the motor patrol crowds them off the grade. It was found best to have the rooter go under the ties about 16 inches from their left end.

The completed motor ways were mapped, numbered, and marked with signboards. Before these roads were opened the time elapsing between the first report of a fire and the attack of the fire fighters averaged three hours. It is now possible to place men at any point within the area in one hour's time.

## National Park Research Reserves

The National Park Service has adopted a definite policy of setting aside selected national park areas as research reserves. On these areas the service will endeavor to maintain unmodified natural conditions for educational and scientific purposes. The research reserves will be located in isolated sections of the parks and will not be approached by roads or trails. Special permits will be required to enter any of them.

Two research reserves have been in existence in national parks for some time, one having been established in Yosemite Park in 1926 and one in Mount Rainier Park in 1928.

## Osceola National Forest Site Chosen for Naval Stores Laboratory

The naval stores laboratory for which Congress has made an appropriation of \$40,000 available to the Bureau of Chemistry and Soils is to be established on the Osceola National Forest, Fla. It will be located near Olustee, about 12 miles east of Lake City. The location on the national forest will make it possible for the laboratory staff to obtain resin from longleaf and slash pines grown under a wide variety of conditions. The gum will be obtained from naval stores operators who have purchased cupping rights on the national forest. The area on which the buildings for the laboratory are to be erected is part of an experimental forest on which the Southern Forest Experiment Station is planning to conduct both silvicultural and naval stores research.

## Carolina Fiber Co. Practices Forestry

The Carolina Fiber Co., paper manufacturers and large-scale farmers, have been practicing forestry for about 10 years on their 30,000-acre property near Lane, S. C. They are cutting only about one-half or one-third their annual timber growth, and are protecting their timberlands from fire with care and with success. Some thinning has been done to get out pulpwood and improve growth. For the past two years the company has been planting slash pine on fields which it could not cultivate to advantage and could not rent at a satisfactory rate. Pines were planted on 75 acres in the winter of 1929-30 and on 200 acres in the winter of 1930-31. The planting has cost only about \$2 per acre, and results have been excellent. Responsibility for the forestry work, including fire protection, rests on the company's manager of farm land and timberland, C. A. Coleman.

## Indian Service Forestry Branch Will Supervise Grazing Activities

The Secretary of the Interior has approved the recommendation of the Commission on Indian Affairs that all grazing activities on Indian reservations be placed under the supervision of the forestry branch of the Indian Service. During the past year an extensive reconnaissance has been conducted on some of the more important reservations. On the basis of information obtained through this work new regulations have been formulated and approved by the department which are designed to bring about uniformity in management and conservative use of grazing resources. Grazing experts are being employed as fast as funds and the requirements warrant.

## "Bitterweed" Poisoning of Livestock

Sickness and death of sheep resulting from poisoning with *Actinea odorata*, a plant known locally as "bitterweed" has been reported with increasing frequency within the past five or six years from the Edwards Plateau country of western Texas. *Actinea odorata* has been known for many years to be present in western Texas; within the past few years it has very rapidly increased in abundance in that locality. The plant is distributed from southwestern Kansas and central Texas across southern New Mexico and Arizona to southeastern California. Reports of "bitterweed" poisoning, however, have come to the Bureau of Animal Industry from the Edwards Plateau country only. The reports indicate that sheep are the animals principally affected, but that goats and cattle also are susceptible.

Results of preliminary experiments made by the Bureau of Animal Industry in the summer of 1930 indicate that if a sheep eats 1.3 per cent of its own

weight of green "bitterweed" in one day it may die from acute poisoning, and that a sheep may become chronically poisoned if it eats as little as 0.1 per cent of its own weight of the plant daily for about six weeks. No specific remedy is known. Poisoned animals should be put where there is none of the plant and should be given plenty of good wholesome feed and plenty of fresh, clean water.

Facts established in recent years that may bear directly on the increased abundance of *Actinea odorata* and on the increased number of cases of poisoning from this cause is that long-continued overgrazing, by depleting nutritious forage plants, gives obnoxious plants a chance to get a foothold, and that when animals eat poisonous plants it is usually because of lack of proper food. It is pointed out, also, that after subsisting on dry forage for weeks or months sheep become ravenously hungry for green feed and frequently will eat almost any green plant that is available. A special factor in the dangerousness of the "bitterweed" is its habit of starting growth at any time of year, whenever conditions of moisture and temperature are favorable.

## Georgia Firm Tests French Turpentine System

The French system of turpentine is being introduced by the Brunswick Peninsula Co. on lands in Glynn and Ware Counties, Ga. The operation involves four crops of about 6,000 cups each. For each crop the entire operation of chipping the trees and dipping the gum will be handled by one man, working under the direction of R. E. Benedict, the company's forester. By chipping French faces only 2 to 4 inches wide and freshening these faces weekly with the removal of a thin shaving only about one-fourth inch thick, Mr. Benedict believes he can obtain a profitable gum yield from much old back-boxed timber that would not support the typical American face 6 to 14 inches wide.

Each of the turpentine farmers will live near the tract of timber for which he is responsible, and in conjunction with his work on the timber will grow livestock, feed, and vegetables. One reason for distributing the woods workers over the forest is the belief that better fire protection can be obtained in this way than by housing them in centralized camps or quarters.

A sudden increase of the western pine beetle took place last year on plots of western yellow pine timber on the Sierra National Forest, Calif., where the insect had been in an endemic status for four years. Examining the plots in the spring of 1931, Entomologist J. M. Miller found that large groups of trees had been attacked.

## Chinese Elms for Oklahoma Golf Courses

High praise for the Chinese elm comes from Jay C. Painter, of the Oklahoma State Golf Association. Five years ago Mr. Painter planted some seedlings of this species obtained from the United States Department of Agriculture, and since then he has grown several thousand of the trees from seed imported from China. In July, 1930, some of the latter, grown from seed imported in July, 1926, were 6 inches in diameter and from 20 to 30 feet high. During the past two years the planting has been continued without the necessity of importing seed, because trees of the earlier plantings had come into bearing. The trees have shown no susceptibility to disease or to the attack of insects, require very little water, and "have lived through our hot and dry Oklahoma summers without any attention whatever."

The Chinese elm is particularly desirable for use on golf courses, Mr. Painter explains, because its leaves, only about one-fourth as large as those of the American elm, do not litter up the fairways and greens in the late fall. The trees leaf out very early in the spring and retain their foliage long after other deciduous trees are bare.

## Tent Caterpillar Defoliating Virginia Forests

One of the worst outbreaks of the forest tent caterpillar ever recorded by the United States Bureau of Entomology has taken place this year in Buckingham and Fluvanna Counties, Va. Complete defoliation of forest trees has been observed over considerable areas. As other outstanding forest entomological conditions of 1931 the bureau reports that the larch case bearer is heavily infesting the larch of New Hampshire, Vermont, and parts of Pennsylvania, heavy stands appearing as if scorched by fire owing to the feeding of this insect, and that the European pine shoot moth is becoming generally prevalent in southern New England, southern New York, New Jersey, and Pennsylvania, infestation being confined thus far to nurseries and transplanted trees.

## New Instruments for the Weather Men

Development of two new instruments for measuring wind velocities is reported by the American Meteorological Society. One is a small hand anemometer designed to measure wind velocities under 10 miles an hour. This device, developed from a hot wire grid, is so delicate that the needle on its gauge vibrates when demonstrators breathe against it. The other is described by Capt. James A. Code, jr., as follows: "To

overcome poor visibility under cloudy or foggy conditions the Signal Corps has developed a radio transmitter which is attached to several balloons and tracked by two direction finders located at the ends of a known base line. With the angles thus determined, the ascensional rate of the balloon is known, and its elevation and hence the speed and direction of the wind can be calculated at various levels."

## American Forestry Association Meets

Acquisition of national and State forests, control of erosion, and the solution of the idle-land problem were prominent among the subjects discussed during the annual meeting of the American Forestry Association, held jointly with that of the North Carolina Forestry Association in Asheville, N. C., June 3-5. Nearly 400 attendants heard talks by Ray Lyman Wilbur, Secretary of the Interior; Robert Y. Stuart, Chief of the United States Forest Service; Hugh Hammond Bennett, of the Bureau of Chemistry and Soils; William G. Howard, superintendent of forests and parks, New York; L. C. Gray, of the United States Bureau of Land Economics; and Henry S. Graves, dean of the Yale School of Forestry. Other features of the meeting were the planting of a George Washington memorial walnut tree by Boy Scouts on the Asheville city-county plaza; a trip to Mount Pisgah on the Pisgah National Forest; the first public showing of the association's new 3-reel educational motion picture, "Burnin' Bill"; and a visit to the large rayon plant of the American Enka Corporation, near Asheville, where the delegates saw rayon being made from 100 per cent spruce pulp. The forestry cup annually awarded by the association on the basis of a competitive showing of forestry educational material was won for the third time by the Western Forestry and Conservation Association, of Portland, Oreg.

George D. Pratt, of New York, was reelected president of the association, and two new directors were named—C. Arthur Bruce, of Tennessee, director of the Hardwood Manufacturers Association, and Joy Morton, of Illinois, founder of the Morton Arboretum.



Bigleaf maple logs, producing highly figured veneers, are being purchased by one concern in the Pacific Northwest at \$175 per 1,000 board feet. The logs are usually cut into ½-inch veneer, the bulk of which is shipped to eastern furniture manufacturers and used for overlays and inlays in high-grade furniture. Oregon white oak logs 14 to 16 feet long, straight and clear, are being bought by another concern at \$75 per 1,000 board feet. They are cut into timbers which are used largely in the pulp and paper mills of the region for machinery foundation purposes.

# Foreign Notes

## The National Pinetum at Bedgebury

By W. DALLIMORE

[From Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew, No. 4, 1931]

Increasingly unsatisfactory atmospheric conditions at Kew, together with natural soil that is not very suitable for certain genera of coniferous trees, proved, after a long trial, that the attempt to cultivate a full collection of hardy conifers in the Royal Botanic Gardens, Kew, must sooner or later be abandoned. With this in mind an arrangement was made whereby Kew and the forestry commission should become jointly responsible for the formation of a new national pinetum on forestry commission land at Bedgebury in Kent, where numerous well-grown conifers 45 years old and upward already existed.

In view of the difficulties created in the past through lack of historical data connected with many famous collections of trees, the committee responsible for the undertaking made provision for recording planting operations, the enumeration of plants, and a quinquennial review of the pinetum and its contents. To aid in this a planting book has been kept in which all the trees are entered with species index numbers from 1 upward, whilst the individual plants of a species are given a letter from A onward—e. g., *Abies lowiana* 3.A: 3.B: 3.C: 3.D: 3.E: 3.F. Varieties are further separated by means of other signs, as *Abies lowiana* var. *glauca* 3.X.A: 3.X.B: 3.X.C. As these indicatory signs are given on the permanent labels attached to the plants, it is possible with little trouble to keep a definite record of each individual.

A number of plants were sent from Kew to the forestry commission's nursery for the new pinetum in 1924, but it was in March, 1925, that planting was begun; the first quinquennial period, therefore, closed in 1930. In order to bring later planted trees into line with those planted in 1925 for the review in 1935, all plants were remeasured at the end of the 1930 growing period. Thus, whilst some plants had had six growing seasons at Bedgebury, others had had only five, four, three, two, or one. The majority, however, were planted in February, 1926.

Where a large collection of trees from all the temperate parts of the world is assembled, there are bound to be some that do not thrive so well as others, and the collection at Bedgebury is no exception. The general condition of the trees, however, justifies optimistic opinions for the future of the undertaking. In some instances extraordinary growth has been made, and the trees have an appearance of rude health. In other

cases growth has not reached expectations; but even in such instances it is comforting to find that root action has been particularly vigorous, even though branch development has been slow.

The five years 1925–1930 were not particularly favorable to tree growth, and the more or less expected cultural difficulties incidental to the establishment of a large collection of trees have been present.

During the springs of 1926, 1927, and 1928 there were severe frosts which seriously injured the earlier-growing species, more particularly *Abies* and *Picea*. Some did not recover; others, due to an excellent root system, have formed strong new leading shoots from adventitious stem buds. As the small plants have been found to suffer from spring frosts much more severely than taller ones, it is hoped that as height increases so danger from late spring frosts will gradually disappear. Unusually severe weather was experienced during the winter of 1928–29 which resulted in the death of a number of more or less tender species, some of which had passed through one, two, or three winters with little injury. The growing seasons of 1929 and 1930 were favorable and little harm was caused by spring frost.

Insect pests have been troublesome throughout the five years the pinetum has been in existence. Pine weevils and pine beetles, in the earlier days, caused a good deal of injury amongst young pine trees, but constant trapping had the desired effect, and no damage from these pests has been noticed during the last two years. A little injury is being caused by the pine-shoot tortrix moth and the pine sawfly, but hand picking has kept them from making progress. The presence of green spruce aphid on several species of *Picea*, and *Dreyfusia* on certain species of *Abies*, is a more serious problem, for the pests are abundant on large trees in the vicinity, and as fast as young trees are cleaned by spraying, insects appear again from surrounding trees. The *Piceas* most susceptible to attack are *P. alba*, *P. sitchensis*, *P. pungens*, and *P. engelmanni*, and throughout the growing season it is necessary to spray them at least once a fortnight. In January of the present year the green spruce aphid was active and breeding. The larch shoot moth (*Argyresthia laevigatella*) is present on the larches, but it is not doing much harm.

Fungus diseases have caused the death of a number of trees. Of these the honey fungus (*Armillaria mellea*) has taken the highest toll. As there are so many dead stumps of trees about the ground, losses from this disease must be expected \* \* \* Weymouth pine<sup>2</sup>

<sup>2</sup> *Pinus strobus*, known in the United States as northern white pine.—Ed.

rust (*Cronartium ribicolum*) has been noted amongst the 5-leaved pines, and affected trees of *Pinus strobus*, *P. excelsa*, and *P. armandii* have been destroyed in an endeavor to prevent the spread of the disease \* \* \*.

An item of considerable interest in the pinetum is the natural regeneration that is in progress. In some parts young Scots pine have been numerous enough to form a well-stocked forest. Other naturally regenerated trees are Lawson cypress, Douglas fir, Sitka spruce, *Thuja plicata*, *Tsuga albertiana*, and *Abies grandis*, in addition to common trees such as holly, oak, sweet chestnut, etc. Amongst the Scots pines a good deal of difference is noticeable in length, width, and shape of leaf.

The violent winds experienced during the autumns of 1928 and 1929 blew down between 30 and 40 old specimens of *Pinus sylvestris*, *Abies grandis*, *Cupressus thyoides*, *C. lawsoniana*, *Thuja plicata*, *Pinus banksiana*, and other trees. Many of these were between 70 and 90 feet high and 50 or 60 years old. Most of the trees blown down were in places where the water table was within 12 or 15 inches of the surface and the trees were very shallowly rooted.

### Norway Spruce for Windbreaks in Eastern Canada

A single row of Norway spruces 8 to 10 feet apart makes a good windbreak for the protection of houses and farmyards in eastern Canada, according to W. T. Macoun, Dominion horticulturist. This tree grows rapidly and is hardy in almost any place where apples can be grown successfully. Eventually the trees have a spread of 25 or 30 feet. In very exposed places a row of Norway spruces may be planted 8 to 10 feet behind a row of northern white cedar, which is rather slow growing. Northern white pine, European larch, Lombardy poplar, and Austrian pine are recommended as rapid-growing trees that may be used for windbreaks in eastern Canada. The windbreak should be at least 60 feet away from the buildings it is desired to protect. If it is closer the accumulation of snow may be too great. On the prairies the native white spruce (*Picea canadensis*) is recommended for windbreak planting. Here a closer spacing is suggested.

### National Parks and Forest Reserves of Poland

Poland has 6 national parks, with a total area of 25,196 hectares, and 48 forest reserves aggregating 5,469 hectares. Especially well known is the park of Bielowieza, northeast of Warsaw, in the center of an extensive wooded area which at the time of the Russian domination was a Crown forest. Here the timber is predominantly of pine, oak, beech, and alder, and specimen trees of great stature are numerous. Like-

wise in the forest of Bielowieza two reserves have been created with the purpose of conserving exceptionally interesting stands of fir and Scotch pine. Aside from their forest growth, features of the parks are peaks with elevations as high as 2,663 meters and a variety of wild life, including chamois, marmot, bear, lynx, deer, and eagle.

The creation of national parks and forest reserves is a function of the Polish National Council for the Protection of Nature, which has been in existence since 1925 as an official body presided over by a deputy of the Minister of Public Instruction. For five years prior to that date the council, of 20 members, was active as a provisional consultative commission. During both periods it has had as its president W. Szafer, professor of botany in the University of Cracow. The council publishes an annual and many popular and scientific bulletins.

### Neuchatel Reserves a "Natural Area"

The Bois des Lattes, in the Canton of Neuchatel, Switzerland, has been purchased with public and private funds and set aside as a forest reserve. H. Spinner, president of the cantonal commission for the protection of nature, explains in the *Journal Forestier Suisse* why this was done:

The peat bogs of Neuchatel, celebrated in the works of Lesquereux, of Christ, of Früh, and of Schröter, are on the verge of disappearing. Exploitation, drainage, and cultivation are little by little destroying them; it is to be expected that they will do so. But when one area, easily accessible, epitomizes on less than 20 hectares the various stages of evolution of one of these peat bogs—prairie, flat marsh, marsh with hummocks [marais bombé], waste land, and forest—it should be conserved; that is what has been done in the case of the Bois des Lattes.

As a leading element in the scientific interest attaching to the area Professor Spinner mentions the opportunity to conserve certain plant species requiring the acid humus of the peat. Among these he names sphagnum, *Andromeda*, cranberry, sundew, *Carex chordorrhiza*, and dwarf birch. Besides this there is the opportunity for comparing the flora of the peat bog with that of neighboring lands and studying its origin and for reserving to future generations a specimen area, unaffected by the evolutionary cycle, of a type highly important in working out the history of the evolution of the forest following the disappearance of the glaciers. A secondary element is the fact that the Bois des Lattes was formerly a part of the estate of Combe-Varin, which was the rendezvous of a group of savants. The æsthetic interest of the peat bogs is no less, avers Professor Spinner; at every season the new reserve presents an interesting and varied aspect, as the paintings of Jean Mathey attest.

The management of the area has been intrusted to the University of Neuchatel.

## Nearly One-third of Bavaria Forested

Bavaria contains 19.6 per cent of Germany's total forest area of 12,600,000 hectares, according to information transmitted by Consul General Charles M. Hathaway, jr., Munich. Forests occupy 32.6 per cent of Bavaria's total area, as contrasted with 27 per cent of the area of the Republic and 25 per cent of that of Prussia. Of the total forested area in Germany, 32.6 per cent is the property of the Republic and the States, 15.5 per cent is communal property, and 47.8 per cent is in private ownership; in Bavaria 33.7 per cent is the property of the Republic and the States, 12.9 per cent is the property of the communes, and 49.7 per cent is privately owned. The proportion of forested area privately owned rises to 51.5 per cent in Prussia; in

Wurttemberg and Baden, where communal ownership is high, it falls to 34.5 per cent and 35.5 per cent, respectively. Coniferous forests compose 79 per cent of the Bavarian total.

The figures quoted were derived from the German forest census of 1927.



Italy's celebration, last September, of the two-thousandth anniversary of the birth of Virgil culminated in the inauguration of a Vergilian park, near Mantua. The preparation of the park had been in progress since December, 1929. Its flora is said to include nearly all the woody and herbaceous species mentioned in the Georgics.

## Personals

The membership of the first Arkansas Forestry Commission is as follows: H. R. Koen, supervisor of the Ozark National Forest; A. L. Strauss, of the Malvern Lumber Co., Malvern; and S. J. Arnold, general manager of the Crossett Lumber Co., Crossett.

The membership of the Utah State Land Board, recently appointed by Governor Dern under the provisions of an act reorganizing the board and giving it increased authority with regard to flood-control measures, is as follows: Elias A. Smith (chairman) and Joel R. Parrish, both employed on a per diem basis, and J. F. Mendenhall, employed as a full-time executive secretary.

D. Vivian Anderson, of Cincinnati, has been elected chairman of the Central States Forest Research Advisory Council for the coming year. Tom Wheeler continues as vice president and E. F. McCarthy as secretary.

Edwin A. Miller has been appointed a member of the California State Board of Forestry, filling the vacancy caused by the resignation of R. C. Harbison.

M. I. Bradner has been appointed director of the work to be done in the Inland Empire in connection with the forest survey now being made by the United States Forest Service under provisions of the McSweeney-McNary Research Act. Mr. Bradner will continue to be stationed at the Missoula, Mont., regional headquarters of the service, and will retain his position as chief of the office of forest products there.

Frank T. Murphey and Ira Bull now occupy the two extension forester's positions at the Pennsylvania State College, one of which was recently left vacant by the death of C. R. Anderson. Extension Forester Murphey recently received the master's degree from the Yale School of Forestry.

F. J. Hallauer, principal engineer of the Forest Products Laboratory, is being transferred to the Washington office of the United States Forest Service to take charge of the requirements phase of the forest survey. This work will involve a study of past and present use of wood, of trends in that use and their causes, and of probable future trends. An effort will be made to determine to what extent the United States can meet its future wood needs and, if it is found that our wood-productive capacity is likely to be greater than our needs, to ascertain the possibilities for a profitable disposition of the surplus. While a member of the laboratory staff Mr. Hallauer has made special studies bearing directly on this phase of the survey, including a study of the effect on wood use of competition from other materials.

J. Nelson Spaeth, of the New York State Agricultural College, will be on sabbatic leave during the school year 1931-32 and will spend the year working for the doctorate as a fellow in the Yale School of Forestry.

Arthur Ringland sailed June 8 to enter upon his duties as forestry representative in Europe of the United States Department of Agriculture. After a brief sojourn in and near London he planned to go to Paris in July and there to attend the International Congress of Wood and Silviculture held in connection with the International Colonial Exposition.

Andrew E. Douglass, of the University of Arizona, has received a prize of \$2,500 from the Research Corporation in recognition of his studies of the growth rings of trees as recording rainfall and his compilation on this basis of a calendar that goes back to 1000 B. C. The prize is one of two awarded by the corporation each year to scientists who have made important discoveries without expectation of pecuniary reward.

A. R. Mann, dean of the New York State Colleges of Agriculture and Home Economics, has been elected to the newly created position of provost of Cornell University. Doctor Mann had been dean of the College of Agriculture for 15 years. In assuming his new position he will resign the deanship of the two State colleges.

George Sherman Avery, since 1928 a member of the Liggett and Myers Research Foundation at Duke University, has been appointed professor of botany at the Connecticut Agricultural College.

Members reappointed this spring to the North Carolina Board of Conservation and Development are E. S. Askew, Merry Hill; R. Bruce Etheridge, Manteo; Sanford Martin, Winston-Salem; and E. D. Cranford, Asheboro. All these men were members of the State's first board of conservation and development, appointed in 1925 by Gov. A. W. McLean.

F. A. dos Santos Hall, assistant professor of forestry in the University of Lisbon, Portugal, has come to the United States for at least a year's study of forest mensuration on a Portuguese national scholarship. He is working in the Washington (D. C.) office of the United States Forest Service. Professor Hall has charge of investigative work in the forest experiment station recently established by the Portuguese Government as a part of the University of Lisbon. Much of his study has been in connection with French and Portuguese turpentine practices.

D. S. Jeffers, who spent the past school year as a graduate student in the Yale School of Forestry, has resigned his forestry teaching position at the Iowa State College of Agriculture and accepted one in the University of Washington.

Ralph C. Hall, assistant entomologist of the Division of Forest Insects, United States Bureau of Entomology, has been assigned to the Central States Forest Experiment Station this year to study the locust borer. In the Central States there are few black locust trees that have reached the age of 10 years without being injured by this insect. Mr. Hall will work in close cooperation with L. F. Kellogg, who will have a party in the field studying the growth and yield of black locust with particular reference to plantations. This party will include A. G. Chapman, who in partial fulfillment of the requirements for a doctor's degree is making a study of the influence of nitrogen-fixing bacteria upon the growth of the black locust.

Lewis M. Turner has accepted appointment as assistant professor of forestry at the University of Arkansas. Mr. Turner received the bachelor's and master's degrees from the University of Illinois in 1923 and 1925, respectively, his graduate work being in the field of botany. He taught biological science in Blackburn Junior College, Carlinville, Ill., for four years, and has devoted the past two years to studies of plant ecology as a fellow in the botany department of the University of Chicago.

Richard F. Hammatt has resigned as secretary of the California Redwood Association and is returning to the United States Forest Service as chief of public relations in the Northern Region, with headquarters at Missoula, Mont. Mr. Hammatt, who is a forestry graduate of Harvard University, was formerly connected with the Forest Service from 1906 to 1921. He was supervisor of the Shasta National Forest, Calif., from 1910 to 1918, and from 1918 to 1921 was in charge of public relations work in the California Region.

Elliott S. Barker is now game warden of New Mexico. Mr. Barker was a member of the United States Forest Service from 1909 to 1919, serving during the last part of that period as supervisor of the Carson National Forest, N. Mex.

A. D. Read, formerly forester for the Long-Bell Lumber Co. at De Ridder, La., is temporarily connected with the Texas Forest Service. He is collecting data required for the preparation of forest type maps of the four Texas State forests.

Officers elected for the coming year by the Botanical Society of New Orleans are Miriam L. Bomhard, of Newcomb College, president; William T. Penfound, of Tulane University, vice president; Philip C. Wakeley and L. J. Pessin, of the Southern Forest Experiment Station, secretary and treasurer, respectively.

Fred W. Fletcher has been appointed instructor in the department of entomology, New York State College of Forestry, to fill the vacancy created by the resignation of R. L. Taylor. Mr. Fletcher received the A. B. degree from Miami University in 1927 and the M. A. degree from Ohio State University in 1929, and has nearly completed the requirements for the doctor's degree. He has had two years' teaching experience and has had three summers' field experience with the United States Bureau of Entomology.

Bert R. Lexen has left the Washington (D. C.) office of the United States Forest Service to attend the summer session of the Iowa State College of Agriculture, where he is registered for courses under R. A. Fisher, of the Rothamsted Agricultural Experiment Station, England. In the fall Mr. Lexen will report for duty as forest mensurationist at the Southwestern Forest Experiment Station.

Foster Steele, of the Cascade National Forest, Oreg., has been promoted from the position of fire assistant to that of assistant supervisor.

A. G. Angell, fire assistant on the Whitman National Forest, Oreg., has been promoted to the position of assistant supervisor of the Deschutes National Forest, Oreg.

James P. Farley, junior range examiner on the Sequoia National Forest, Calif., has been transferred to the Lassen National Forest, Calif., as assistant supervisor.



Ralph S. Hosmer, head of the Cornell University department of forestry, has been appointed by Conservation Commissioner Henry Morgenthau, jr., as a member of the advisory council of the New York State Conservation Department.

A. W. Hartman, who has been handling timber-sale work on the Ouachita National Forest, Ark., is being promoted to the position of assistant supervisor of that forest, succeeding R. M. Conarro. Mr. Conarro is being transferred to the Cherokee National Forest, Tenn., as assistant supervisor.

Lester Moncrief has been transferred as assistant forest supervisor from the Umatilla National Forest,

Oreg., to the Columbia National Forest, Wash. He succeeds J. M. Mann, now superintendent of road construction on the Columbia.

Hugh P. Baker, dean of the New York State College of Forestry, has been appointed a member of the Charles Lathrop Pack Forest Education Board.

Robert Oliver Sweezey, president of the Beauharnois Power Corporation, is president of the Canadian Forestry Association this year.

James L. Averell, of the staff of the Southern Forest Experiment Station, will enter the University of California in August as Baker fellow in forestry.

## Bibliography

### Softwood Resources of the World

By W. N. SPARHAWK, United States Forest Service

Streyffert's monumental work<sup>3</sup> on the world's softwood timber resources is a most valuable and timely contribution. It gives the most recent available information, by continents and by individual countries, on the character and extent of softwood resources and the production, consumption, exports, and imports of sawed lumber, round timber, pulp, paper, and other products. For many countries the statistics include data for 1929; for some, 1930 figures are given. It is interesting to note that in the period 1925-1927 North America, with 40 per cent of the world's area of conifer forests, produced 54 per cent of the 64,000,000,000-foot average annual softwood lumber output of the world and that Europe, with only 18 per cent of the area, produced 34 per cent of this output.

The volume of international trade in sawed softwood lumber has trebled since 1880. In 1927 the countries producing such lumber exported 22 per cent of the softwood cut. Sweden's share in the exports decreased from 24 per cent in 1880 to 13 per cent in 1927, while the United States' share increased from 5½ to 17½ per cent. Great Britain took 50 per cent of all the imports in 1880 and only 28 per cent in 1927. In the latter year the United States and Germany took 11 and 10 per cent, respectively. For Europe as a whole softwood imports exceeded exports until 1925, but since then exports have taken the lead.

The world production of wood pulp increased from 6,966,000 tons in 1911 to 16,763,000 tons in 1929. During this period the output of the principal producing countries increased as follows: Japan, 757 per cent; Canada, 688 per cent; Finland, 375 per cent; Sweden, 165 per cent; Norway, 94 per cent; the United States, 71 per cent; and Germany, 68 per cent.

In 1927 Sweden, with 2 per cent of the world's conifer forests, produced 4 per cent of the softwood lumber, 8 per cent of the mechanical pulp, and 19 per cent of the chemical pulp. The United States, with 11½ per cent of the forests, produced 45 per cent of the lumber, 24 per cent of the mechanical pulp, and 29 per cent of the chemical pulp.

Following a comprehensive summary of the world situation, the author concludes that there is no reason to anticipate a decrease in the world's softwood requirements; that, on the contrary, the demand is likely to increase. Because of the higher prices that will ensue, together with better utilization and with increased yields resulting from forest management, softwood forestry is bound to be reasonably profitable in the long run.

The value of the book is greatly enhanced by numerous graphs and excellent photographs. It is to be hoped that an English edition can be published in the near future.

### Lumber Production and Wood Utilization in Southeastern Minnesota

By W. D. BRUSH, United States Forest Service

Results of a survey of the use of wood in manufacture which covered 14 counties of Minnesota have been published by the University of Minnesota Agricultural Experiment Station in a bulletin by L. W. Rees entitled "Lumber Production and Wood Utilization in Southeastern Minnesota."

A short account of lumber and tie production particularly applicable to small timber holdings includes information on charges for sawing lumber and costs of producing ties in the region. The greater part of the bulletin is taken up with a presentation of consumption data for 1927 on the wood-using industries of southeastern Minnesota. Tables show wood consumption, by kinds of wood, for the section and for each class of wood-using industry in the section, indicating what portions of the wood consumed were and were not

<sup>3</sup> Streyffert, Thorsten: *Världens Barrskogstillgångar*. 780 pp. Svenska Skogsvårdsföreningens Förlag (Swedish Forestry Association), Stockholm, 1931.

grown within the State. Wood grown outside the State is shown to have made up about 80 per cent of the quantity consumed in the counties covered by the study. Evidently there is much need for encouraging the growing of timber on rugged areas of this section that are not adapted to cultivation. The secondary industries of this region are shown to have used about 153,000,000 board feet of wood in 1927, exclusive of the quantities used for cooperage. Lumber production in the same counties in 1928 is reported as 6,178,300 board feet. This indicates that a large part of the raw material for these secondary industries is used in the log or bolt form. Brief recommendations in regard to marketing woodland products give the comparative advantages of several selling methods.

Although there is much information in this publication that will help the small timber owner of the region to locate a profitable market for his products, it seems that its value would have been greatly increased by the addition of more detailed and specific data, including information on the kinds of wood in particular demand, the most desirable forms for marketing, and lists of prospective purchasers.

## The World's Hardwood Supplies

By W. N. SPARHAWK, United States Forest Service

In a recently published survey<sup>4</sup> of the world's hardwood resources in relation to Germany's requirements, Arnim Lühdorf points out an important difference between the softwood and the hardwood situation. With softwoods, consumption exceeds growth, and the big problem is to prevent depletion; on the other hand, there are vast undeveloped supplies of hardwoods in the Tropics, and the most pressing problem with these is to increase consumption.

In order to build up a demand for tropical woods in the industrial countries, several measures are essential. The tropical forests must be studied so as to ascertain what kinds of useful woods are available in sufficient quantities to insure steady supplies. The present confusion in trade names must give way to a standard nomenclature. Methods of exploitation must be made more efficient, and the industry must be adequately financed and organized on a stable basis. All exploitation should be under supervision of a trained forest service in order to insure perpetuation of the resource. Producers must cooperate; they should preferably market their timber through a common selling organization, thus enabling customers to rely upon steady, adequate supplies of the desired kinds of wood such as production by individuals can not insure.

Germany imports most of her hardwoods through the ports of Rotterdam, Bremen, and especially

Hamburg, which is the leading hardwood-importing center on the Continent. American dye and tanning extract woods began to come to Hamburg early in the sixteenth century; importation of American mahogany, cedar, and other cabinet woods started about 300 years later; and walnut, oak, ash, and hickory from the United States entered the market about 1850. Importation of African woods began about 1890 and that of Australian woods after 1900.

Since the war there has been a heavy decline in imports of American woods, except hickory. American oak is poorer in quality and much higher in price than formerly; better oak is supplied by Europe (Poland, Czechoslovakia, Yugoslavia) at lower cost. American mahogany is too expensive and now goes mostly to Liverpool, while Germany takes African mahogany and other less costly cabinet wood. Spanish cedar has largely been supplanted by African okumé for cigar boxes.

Germany's normal requirements for hardwoods are large and varied. In her own forests hardwoods compose less than one-fifth of the stands, their growth is relatively slow, their average quality is rather poor, and hardwood species are few. Although several European countries are now supplying excellent oak, their supplies are limited and are not likely to last. The United States can not be counted on as a future source of large quantities of high-grade hardwoods. The conclusion is that Germany, as well as other importing countries, will have to depend chiefly upon the tropical forests, and that for the near future, at least, Africa will be a more important source than South and Central America.

## Effect of Soil Moisture on Spruce Reproduction

Discussing Yale School of Forestry Bulletin No. 26, The Effect of Soil Moisture on Spruce Reproduction in British Columbia, by Percy Munson Barr, A. C. Forbes has written in the Empire Forestry Journal as follows:

The investigations were devised with the object of ascertaining the most favorable conditions for securing spruce regeneration in Canada and the United States in view of the importance of spruce in the manufacture of paper. The principal difficulty in Canada has hitherto been the succession of spruce by balsam or other silver fir species, and these offer ideal conditions for extensive outbreaks of spruce bud-worm. While seed supplies may be adequate, adverse conditions may exist on the forest floor for the germination and survival of spruce seedlings, and the bulletin deals with attempts to discover these.

The investigation was begun in 1924, when a number of permanent plots were laid out at the Aleza Lake Forest Experiment Station in the Upper Fraser River Valley. This station consists of 6,700 acres of rolling country, forming the watershed of a small unnamed stream, the bulk of which is heavily timbered with *Picea engelmannii* and *P. canadensis*, together with *Abies lasiocarpa*. The germination and survival of

<sup>4</sup> Lühdorf, Arnim: Die Bedeutung des Handels mit aussereuropäischen Harthölzern, unter besonder Berücksichtigung der Stellung Hamburgs. 87 pp. Published by the author. Giessen, 1931.

spruce seed on raw humus and exposed mineral soils were investigated under four sets of conditions: (a) Surface undisturbed, (b) surface shaded, (c) surface watered, (d) surface trenched. Germination was found to be negligible on undisturbed raw humus, but took place freely on exposed mineral soil, and on the latter trenching to eliminate root competition did not produce any definite effect, although it was increased slightly on the humus. Increased shading reduced germination on both surface types. Germination was better on northern than on southern slopes, and artificial watering considerably increased germination on humus, but had little effect on natural soil. From these results it is assumed that the amount of available moisture was the deciding factor on all surfaces.

After spruce seedlings have become established their ability to survive dry seasons appears to be the same on either humus or mineral soil, but considerable mortality, due to disease, occurred in humus.

The general conclusions are that the failure of seeds to germinate on humus soil in the forest is due to their inability to absorb moisture from the particles of organic matter with which they are in contact. In the mineral soil this inability is not perceptible. Artificially breaking up the surface and exposing the mineral soil is assumed to be the remedy for failures in restocking. A similar remedy is probably applicable to most coniferous regeneration in old woodland where the humus layer is old and tough, and has become dry, and decomposition into mild humus is a more or less slow process.

The author does not state the cause of death after germination, although it is assumed to be lack of moisture in most cases, aided by attacks of birds and insects.

ual should be followed by his degrees, office, address, and special field of interest, "botany" being interpreted in its widest sense.

The responsibility of collecting and collating the necessary data from the various parts of the world was assigned by agreement of the committee members as follows: To Doctor Diels, central and eastern Europe, the Union of Socialist Soviet Republics, and most of the countries in South America; to myself, North America, the West Indies, certain countries in South America, Polynesia, and the Philippines; and to Doctor Chipp, the remaining countries. Each member of the committee was directed to obtain the services of such local collaborators as might be deemed necessary. In the areas assigned to me the services of about 80 individual collaborators were obtained. Information as to United States Government employees in the botanical field was handled by a special committee having as chairman William R. Maxon, of the Smithsonian Institution. The central committee is under very great obligation to the numerous individuals who volunteered to assist in obtaining the detailed data required.

All the data, covering more than 13,000 entries, were prepared on index cards, from which the printing will be done direct. The final preparation of the material for the printer was done at Kew. The data are now in the hands of the printers.

A special grant was received from the Carnegie Corporation sufficient to cover the expenses of the central office, and a loan from the Bentham Trustees to finance the actual printing. This financial assistance has made it possible to sell the book at the low price of \$3.25.

Orders for the book may be placed with the printers, Messrs. Baillière, Tindall & Cox, 7 Henrietta Street, Covent Garden, London.

## An International Address Book of Botanists

By E. D. MERRILL, New York Botanical Garden

At the final plenary meeting of the Fifth International Botanical Congress, held at Cambridge, England, in August, 1930, it was unanimously resolved that an international address book of botanists should be prepared and published. To carry out this project a committee was appointed consisting of T. F. Chipp, assistant director of the Royal Botanic Gardens, Kew, England; L. Diels, director of the Botanic Gardens, Berlin-Dahlem; and E. D. Merrill, director of the New York Botanical Garden.

The most recent publication of this kind is Dörfler's *Botaniker Addressbuch*, of which the third edition appeared in 1909. The need of an up-to-date publication has been increasingly felt in late years, with the rapid growth of botanical science and the necessity for more general communication and cooperation among botanists in different parts of the world.

At meetings of the committee held in London following the conclusion of the congress it was agreed that the address book should, in general, follow the scheme of the current edition of Dörfler; that is, that countries should be listed alphabetically and that under the name of each country should appear, in the language of that country (in Roman characters), lists of institutions and societies wholly or in part botanical and a list of botanists in which the surname and initials of each individ-

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